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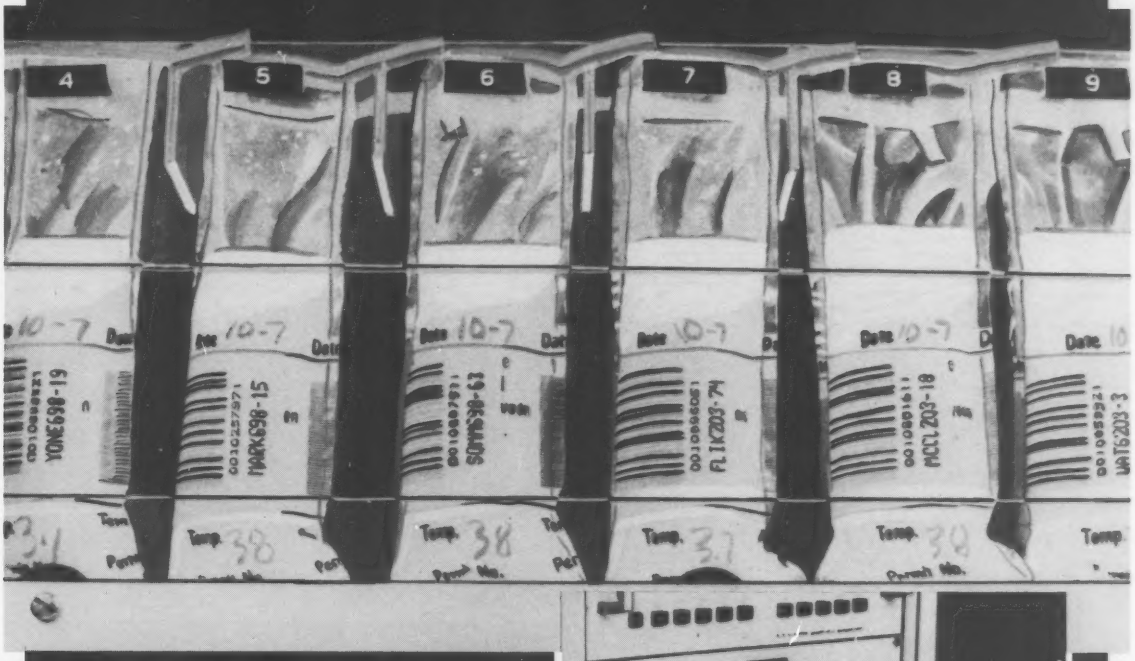

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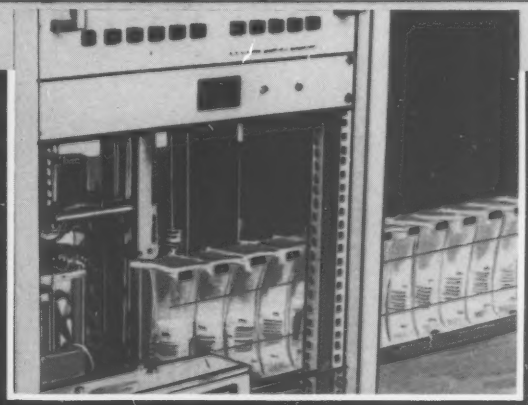

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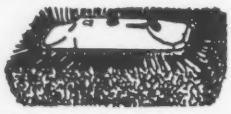
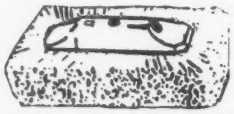
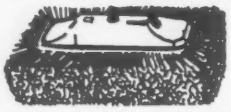


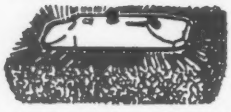
20478 330NR **Black Nylon**



20479 330N **White Nylon**



20480 330ND **Red Nylon**



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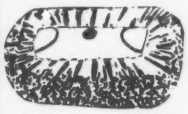
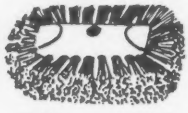


20464 130NR **White Nylon**



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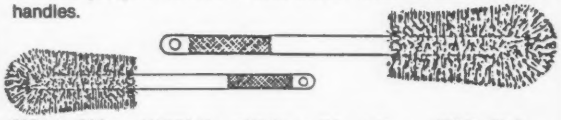
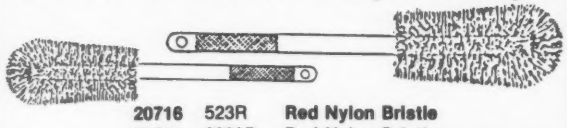
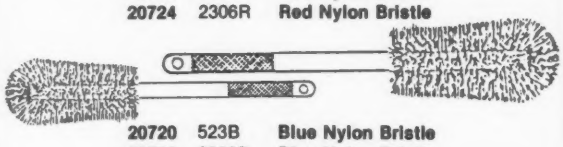


20714 523 2 3/4" dia., 12" Overall Length. **White Nylon**
20726 2306 3 1/4" dia., 15" Overall Length. **White Nylon**



20716 523R **Red Nylon Bristle**
20724 2306R **Red Nylon Bristle**



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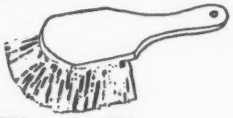

20734 623 **White Nylon**

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20732 623R **Red Nylon**

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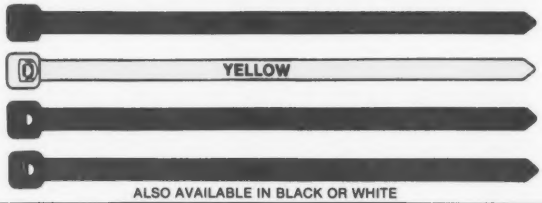

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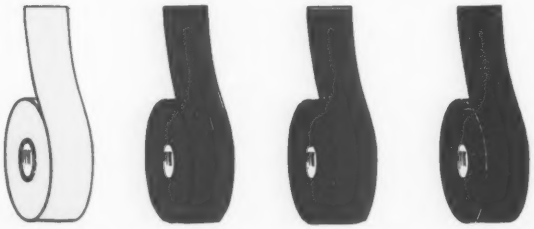

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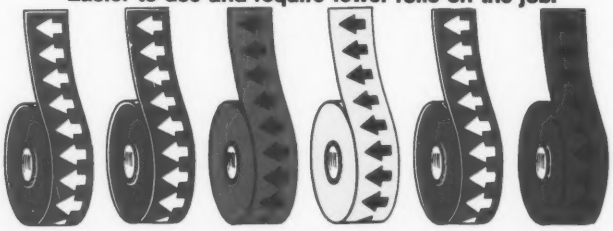

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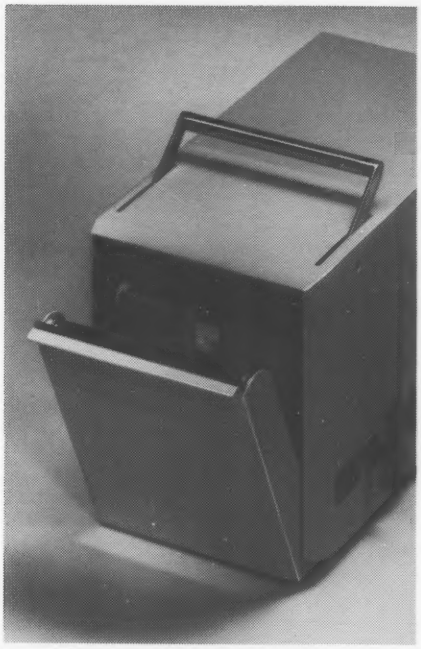

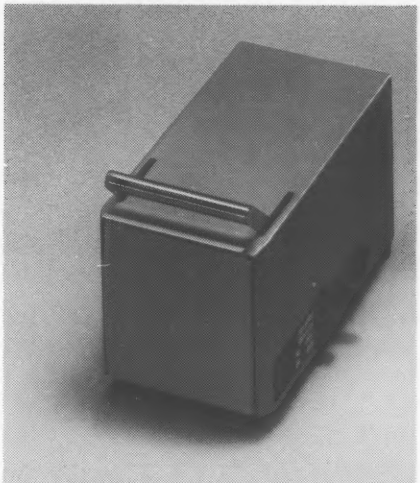

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Dairy and Food Sanitation

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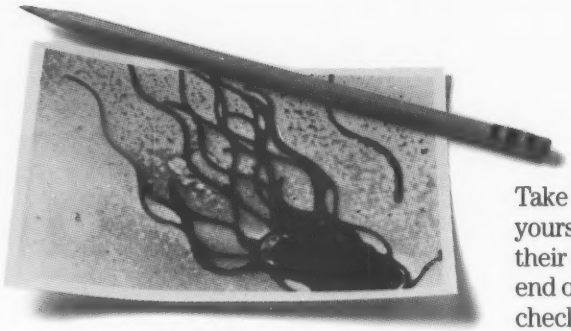

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The Microbiology of Slow-roasted, Stuffed Turkeys

Karl F. Eckner[1], Edmund A. Zottola[1], and Robert B. Gravani[2]

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INTRODUCTION

In the past decade there have been a significant number of changes in the eating and cooking habits of U.S. society. It should therefore come as no surprise that some of these changes have come to affect food science and nutrition. In general, it is recognized that there is a trend towards greater convenience in food preparation and towards better nutrition. Consumer interest in turkey as a nutritious, low-fat, protein food has increased (3). Concomitant with this development is the desire to devote less time to food preparation. These two themes have been united in the long-time low-temperature roasting method for stuffed turkeys. Convenience is gained through methods requiring fewer steps and allowing long blocks of time between preparation steps (4). Low temperature cooking procedures are proclaimed by some authors to result in a more nutritious and higher quality end product.

Concerns about the microbiological safety of foods prepared in this manner are valid. If cooking and holding temperatures are too low, the microbes present may not be destroyed or inhibited; they may even be able to proliferate and/or produce toxins. Turkey stuffing is known to be a vector in many cases of foodborne illness (2,5). The most common bacterial illnesses associated with poultry and stuffed poultry are intoxications caused by *C. perfringens* and *Staphylococcus aureus* or infections by salmonellae. Sources for these microbes are contamination of ingredients or cross-contamination from the poultry carcass (5,6,7). Abuse of the stuffing can also occur during preparation, stuffing, roasting or subsequent storage of uneaten portions (5,6,7).

When a nationally distributed magazine (4) published a recipe for slow-roasting stuffed turkeys at low temperatures, questions were raised about the microbiological safety of the procedure. The objective of this study was to determine the microbiological safety of this cooking procedure by using selected pathogenic microorganisms representative of those likely to be responsible for a food-borne illness in this food.

MATERIALS AND METHODS

Preparation of Turkeys and Stuffing. Frozen turkeys were used in this study. The turkeys were defrosted in a refrigerator at 4°C until thawed and the giblets removed from the body cavity. The carcasses were thoroughly washed and dried with a cloth. The stuffing was prepared and contained the ingredients listed in Table 1. Trypticase soy broth (TSB, Difco) was substituted for the chicken broth to allow for addition of the inocula.

Culture Preparation. The cultures, *S. aureus* 196E, *S. typhimurium* Hf, and *C. perfringens* were grown overnight (18 hr) in TSB.

Turkey Stuffing Preparation. The turkey stuffing was prepared according to the recipe given in the magazine article (4) and consisted of the ingredients listed below (Table 1). One ml of each of the TSB cultures was added to 240 ml of TSB and used in place of chicken broth in the recipe. This was further diluted by incorporation into the stuffing resulting in a population of approximately 10^5/g to 10^7/g stuffing of each organism. The stuffing was mixed with a Kitchen Aide mixer (Model K5A) for one minute.

TABLE 1

Sausage Stuffing Recipe
(Capon, 1983)

Ingredients:
- Giblets from turkey (optional)
- 1/4 cup butter or chicken fat
- Bulk sausage meat (1/2 lb for each 5 lbs of turkey)*
- 1 large onion, chopped
- 1 cup chopped celery
- Day-old bread cubes (about 1/3 cup for each 1lb of turkey)
- 1 to 2 tablespoons poultry seasoning
- Salt and pepper to taste
- 1 to 2 cups chopped chestnuts, brazil nuts or pecans (optional - not used in the experiment)
- 1 cup chicken broth

*Sausage was raw, mild Italian-style sausage in a natural casing

Roasting Procedure. The oven was preheated to 350°F for 30 minutes. The body cavity of the turkeys were completely stuffed. The turkeys were placed into aluminum baking trays. Thermocouples, connected to a recording potentiometer (Type: Brown Electronik, Model No. 153X64P16-X-41), were attached as shown in Figure 1. The potentiometer recorded every 15 seconds with 3 minutes elapsing between a complete recording cycle for all 12 thermocouples. Copper-Constantan thermocouples were used. Temperatures at each hour of roasting were used to construct the graphs. Cycling of the oven thermostat resulted in fluctuating oven temperatures. The turkeys baked for one hour at 350°F, the temperature was reduced to 225°F, and roasted for an additional 12 hours (overnight). After 12 hours the degree of roasting completion was ascertained (Step 3, Table 2) and the temperature was subsequently raised to either 300°F or 350°F in accordance with what the recipe prescribed (Table 2).

TABLE 2.

Slow-Roasting Procedure as Suggested by Capon (1983)

Step	Time and Temperature
1	1 hour at 350°F
2	12 hours at 225°F
3	If the juice is pink, then 1-2 hours at 300°F
4	1 hour at 350°F

Sample Analyses. Fifty-gram portions of the inoculated stuffing were initially diluted with 100 ml of sterile phosphate buffer, further diluted in a dilution series and streak-plated onto Hektoen Enteric (HE) and Xylose Lysine Desoxycholale Agar (XLD) for salmonellae, Baird-Parker Agar (BP) for staphylococci, Sulphite-Polymyxin-Sulphadiazine Agar (SPS) for *C. perfringens* and Standard Plate Count Agar (SPC) for total aerobic mesophilic cell population levels. The HE and XLD agars were incubated at 37°C for 24 hours, the BP and SPS samples at 37°C for 48 hours with the SPS petri dishes being incubated anaerobically, and the SPC at 30°C for 48 hours. Upon completion of the roasting of the turkeys, the thermocouples were removed and the stuffing asceptically removed to a stainless steel cannister containing 12 liters of sterile 0.1% peptone water. The stuffing was mixed to disrupt clumps. The mixture was incubated at 37°C for 24 hours. After incubation, samples of the peptone water enrichment were plated on XLD, HE, BP, SPS and SPC agars and appropriately incubated.

RESULTS

Each of the turkey carcasses received a slightly different roasting time as a result of the different weights (Table 3). It was also of interest to determine exactly how long it took to reach a lethal temperature in the stuffing. From the Figures 1- 4 it can be observed that the stuffing experienced the slowest rate of temperature increase. The slowest heating point in the stuffing was compared to the slowest heating point in the turkey flesh. These points were chosen as they represent areas where survival of microbes would be more likely. In all cases the turkey flesh showed a greater rate of heat penetration than the stuffing. However, the slowest heating point in the turkey flesh was not the same in all instances. In turkeys 2 and 4, the left thigh heated more slowly, whereas in turkey 1 it was the right thigh. In turkey 3, the breast meat exhibited the slowest rate of heating. This is shown in Figures 1-4.

The microbiological analysis for salmonella was negative (Table 4). Staphylococci were not recovered on the agar (Table 4), although faint grey-brownish, smeared growth was observed. However, the colonies in no way resembled *S. aureus* controls. On the other hand, the results for *C. perfringens* were positive (Table 4).

After the 12 hour slow-roasting period, the turkeys were not aesthetically appetizing, but upon increasing the temperature and basting three times during the last hour of roasting, the typical brown coloration and odor of traditionally roasted turkey developed.

DISCUSSION

The fact that no salmonellae or staphylococci were recovered is not surprising. Internal temperature of 165°F were attained throughout the stuffing. This is considered the temperature required for thorough cooking of stuffed turkeys (1). It was assumed that the center of the stuffing would be the slowest heating portion, but this was not always the case. The slight differences in temperature probably are due to minor differences in thermocouple location in the stuffing. However, 165°F was always used as the minimum attained internal temperature during roasting. These temperatures are lethal for salmonellae and staphylococci as these nonsporeforming microorganisms are not as heat resistant as the sporeforming *C. perfringens*. The spores of *C. perfringens* consequently survived the roasting temperatures.

The population levels of survivors were not determined. The primary emphasis of this study was to determine if these potentially pathogenic bacteria survived this long-time low-temperature process. The recovery and resuscitation step of incubating in peptone water should allow recovery of heat-stressed cells. Assuming a few pathogenic cells may be detected from the total microbial flora, an enrichment period of the sample should help in recovery. Such a treatment precludes any simple determination of numbers of surviving microorganisms. Since neither salmonellae nor staphylococci were isolated, it appears that they were completely destroyed. As for the clostridia, the vegetative cells would also have been destroyed by the heat treatment. Thus direct plating of the stuffing might not yield colonies of *C. perfringens*. The levels found in the peptone-water medium reflect the proliferation of cells from the outgrowth of *C. perfringens* spores.

From the data collected, it appears that the recipe may be considered safe for the consumer. There are two points of concern. The first is the visual judgment of roasting completion by juice coloration. Another is that the uneaten

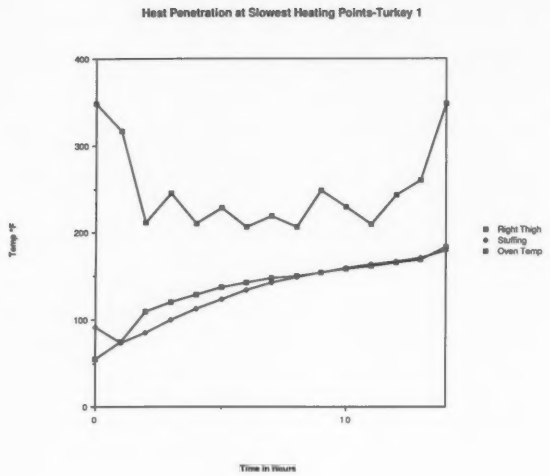

Figure 1. *The rate of heat penetration at the slowest heating points of turkey 1 (weight 11.74 lbs).*

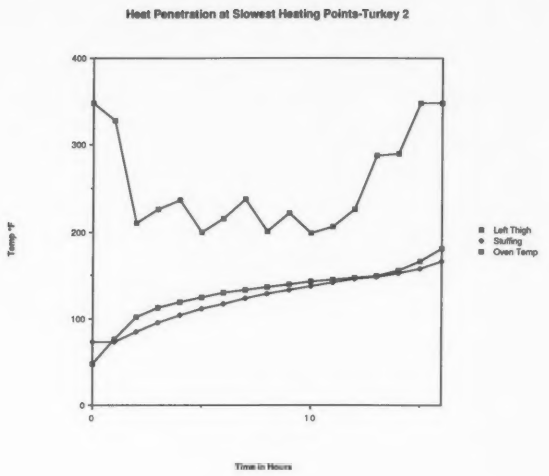

Figure 2. *The rate of heat penetration at the slowest heating points in turkey 2 (weight 29.45 lbs).*

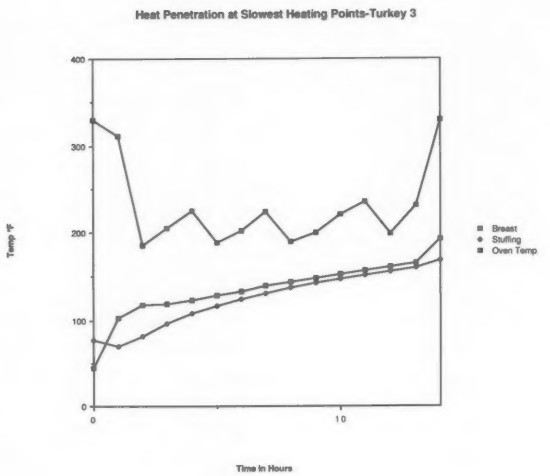

Figure 3. *The rate of heat penetration at the slowest heating points in turkey 3 (weight 25 lbs).*

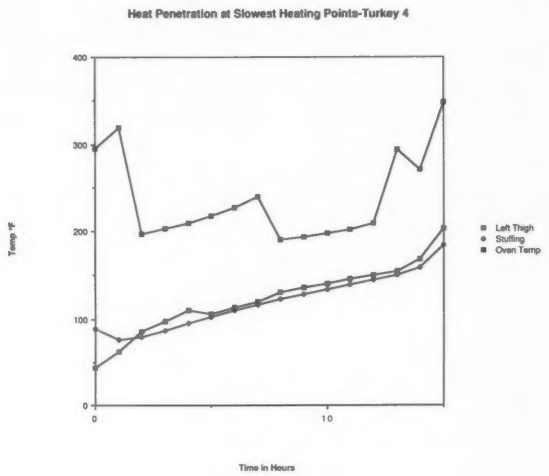

Figure 4. *The rate of heat penetration at the slowest heating points in turkey (weight 25 lbs).*

uneaten portions of stuffing be properly handled to prevent possible *C. perfringens* toxinfection from outgrowth of the spores. If, however, the turkey is undercooked, either due to underestimating the size, improper thawing or misjudging the juice color, or if the body cavities are overstuffed, as in this study, it could be possible for salmonellae or staphylococci to survive.

CONCLUSIONS

If the recipe and preparation steps are properly carried out, the risk of food poisoning should be minimal. If this is not the case, then there exists the possibility that pathogenic microorganisms could either survive the roasting or could produce intoxication. Because control of all the variable involved with this method are difficult to achieve in a home kitchen, the authors would not recommend this as a safe method for roasting stuffed turkeys.

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TABLE 3.

Cooking Times in Hours Elapsed

	Turkey 1	Turkey 2	Turkey 3	Turkey 4
Weight (lbs)	11.74	29.45	25	25
Start	0:00	0:00	0:00	0:00
350°F	1:00	1:00	1:00	1:00
225°F	13:00	13:00	13:00	13:00
300°F	-	15:00	-	14:00
350°F	14:00	16:00	14:00	15:00

TABLE 4.

Number of *S. aureus* 196E, *S. typhimurium* Hf and *C. perfringens* in the Stuffing Before and After Slow-Roasting

CFU/gram

	Turkey 1 uninoc	Turkey 2 uninoc	Turkey 3 inoculated	Turkey 4 inoculated
B-P initial	$1.4x10^3$	$1.9x10^4$	$8.0x10^5$	$1.8x10^7$
post-cook	negative	negative	negative	negative
XLD initial	0	0	$3.4x10^5$	$1.8x10^7$
post-cook	0	0	0	0
HE initial	0	0	$2.8x10^5$	$1.8x10^7$
post-cook	0	0	0	0
SPS initial	0	0	$1.0x10^5$	$1.7x10^7$
post-cook	positive	positive	positive	positive
SPC initial	$2.5x10^6$	$8.0x10^4$	-	-

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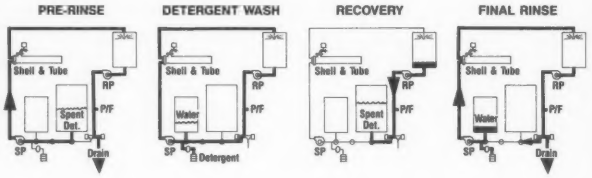

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Refrigeration Does Not Prevent Listeria Growth in Milk, UW Study Shows

Research Division, College of Agriculture and Life Sciences, University of Wisc. - Madison

Listeria monocytogenes has proven its mettle in refrigerated milk.

"We've shown fluid milks to be excellent for growth of the bacterium," says University of Wisconsin-Madison food microbiologist E.H. Marth. "It thrives at 4 degrees C (39 F)."

Once in milk, either through inadequate pasteurization or post-pasteurization contamination, Listeria not only survived but also multiplied at refrigeration temperatures, Marth found.

"Cold storage provides only limited protection from this organisms, making Listeria monocytogenes a pathogen to be reckoned with in the safety of dairy foods," he says.

The bacterium has been found in some dairy factories, dairy animals and apparently healthy humans. Infected cows, sheep and goats can shed the organism in their milk, and may not show symptoms. One U.S. study found Listeria in 15 of 121 raw-milk samples.

Marth and research assistant Eileen Rosenow tested four strains of Listeria. Three caused a listeriosis outbreak in Massachusetts in 1983; the fourth caused the Mexican-style cheese outbreak in California in 1985. People died in both cases.

The researchers inoculated whole, skim, and chocolate milk (2 percent milkfat), and whipping cream (33 to 36 percent milkfat) with the four strains.

At 13 C (55 F), which is not uncommon during transport and storage by consumers, populations reached peak numbers in four to six days, depending on strain.

Listeria grew more solely at 4 C (39 F). However, after an initial delay of five to 10 days, populations doubled about every 36 to 48 hours. Final populations reached 10 million to 100 million cells per milliliter and survived two months of refrigeration.

Raising the holding temperature to 8 C (46 F) cut the generation time by two-thirds.

The bacterium flourished and doubling times fell when incubated at 21 C (70 F) and 35 C (95 F). Marth expected this, since the organism grows best at 30 to 37 C (86 to 99 F).

Based on this study, Marth calculated potential populations that could be produced by a small inoculum (10 or 100 cells per quart) at different temperatures. At 8 C (46 F), populations doubled in less than 12 hours, following a one-day lag phase. Peak populations could reach one million to 10 million per quart in only 10 days. At 13 C (55 F), populations could reach over 10 billion per quart within a week.

A small increase in refrigeration temperature can cause much faster growth. "Where the product is abused -- stored at 13 C (55 F), for example -- very rapid growth can occur," Marth says.

Chocolate milk always had the highest populations of any product held at any temperature. Marth first suspected that sucrose enhanced the bacterium's growth. Later studies showed that cocoa contributed as well. This was surprising, he says, since substances in cocoa powder inhibit other types of bacteria, including Salmonella.

Whipping cream usually had the lowest final number of Listeria, possibly due to its high fat-to-water ratio, he found. However, the bacterium grew nearly as well in cream as in milk. Many bacteria don't, Marth notes.

Differences in results could not be attributed solely to bacterial strain or milk product, Marth points out. Both acted together to produce a given observation. Different strains behaved differently in different products. Differences in generation time were caused primarily by incubation temperature, but also by product type and strain of Listeria.

"We have shown that Listeria monocytogenes is a very adaptable organism," Marth says. "It can grow at low temperatures, like those at which many foods are stored. The danger is compounded for these products as storage temperature increases.

"The bacterium thrives at 4 C (39 F). Post-pasteurization contamination of milk by Listeria could eventually result in substantial populations, even if after contamination the milk was properly refrigerated at 4 C (39 F). Given adequate time, all strains achieved populations of at least 10 million cells per milliliter.

"Even further processing may not render contaminated milk safe," Marth continues. "We've found lengthy survival of listeria in Cheddar and Camembert cheese and in non-fat dried milk.

"Granted, one would not ordinarily store fluid dairy products for the length of time we did; however, with higher initial inoculum levels, the maximum populations we observed could easily be reached in a shorter time."

Researchers don't yet know the infectious dose for Listeria in susceptible humans -- infants, pregnant women and immunocompromised people. It may be as low as 100 to 1,000 cells. A quart of milk could reach these numbers if contaminated with just a few cells and held long enough for the bacterium to grow, Marth notes.

For more information contact Elmer Marth, Dept. of Food Science, University of Wisconsin, Babcock Hall, 1605 Linden Dr., Madison, WI 53706. 608-263-2004.

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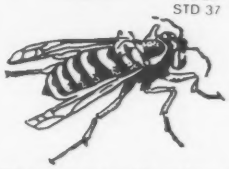

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Dairy and Food Sanitation, Vol. 8, No. 7, Pages 352-353 (July 1988)
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Mother Nature's Regulations on Food Safety

by Roger W. Miller
(Director of FDA's Communications Staff)
Reprint from FDA Consumer/April 1988

Mother Nature is a bureaucrat. That may come as a shocker, but in fact she has a quite complete Code of Regulations. Take food handling, for example. Mother Nature wrote the book on that, and you'd better follow the rules or your tummy may act like it wants to get up and leave.

Mother Nature's regulations say that food has to be handled, stored and cooked properly. Incorrect handling and preparation of foods can bring into play another set of regulations put out by Mother Nature: the rules on toxic bacteria and other microorganisms. Those rules permit these varmints to grow very fast under the right conditions, bringing on unnecessary illness.

And the unnecessary illnesses add up. FDA experts estimate that 21 million to 81 million cases of diarrhea a year are caused by food-borne microorganisms. And that's just one relatively minor consequence of not following the rules. Chronic ailments such as kidney damage, arthritis, and heart problems are other possible consequences.

Among the microorganisms that plague us, bacteria are the main culprits. That might be expected because bacteria are everywhere - in plants, on animals and people, even in the soil. In fact, a teaspoon of soil contains about 2 billion bacteria, and the human body carries 150 kinds of bacteria that number some 100,000 billion! They outnumber the cells in the human body 10 to 1. But only a small number of bacteria are harmful. Some, in fact, are beneficial and are used in making food. They have impressive names, such as *Streptococcus lactis,* used to make buttermilk, and *Lactobacillus bulgaricus,* used to produce yogurt. Beneficial bacteria are also found in the intestinal tract, where they aid in digesting food.

And even those bacteria that harm humans can't do so without assistance. In an attempt to make the rules fair, Mother Nature decreed that bacteria will need food, moisture, warmth and time to do their work. Very high temperatures kill them. Cold stops or slows their growth. But she gave them a keen mind for multiplication. Given the right conditions, some of them can double their numbers every 20 minutes.

Mother Nature also deprived bacteria of a means to get around by themselves. But she let them hitchhike if they could find a ride, and their hitchhiking often results in cross-contamination. When they cling to a knife that is used on different kinds of foods, they get a lift from one to the next.

Mother Nature didn't distribute her Code of Regulations widely (some say not at all), so we'll sum it up for you here.

SHOPPING

Don't buy foods in dented, rusty, bulging, or leaky cans, or in cracked jars or jars with loose or bulging lids. If you have them, don't' use them. Did you every notice that most supermarkets have the frozen foods section located at the end of a normal shopping tour? That's so you will select them last, giving them less time to thaw. When you've finished shopping, don't dally on the way home. Get the frozen items and perishables, such as meat and dairy products, into the refrigerator as soon as possible.

EQUIPMENT

All food preparation equipment must start out clean and stay clean all through the meal-making. Let's start with one of the most important pieces of equipment: YOU.

Your hair and body should be clean. If your hair is long, cover it with a cap or net. Wash your hands before starting any meal preparation, and wash them again between handlings of food, after using the bathroom, and after smoking. Proper hand washing requires soap, warm water, and at least 20 seconds of working the soap into the hands, including the fingernail area and in between the fingers.

Don't smoke on the job. (Better still, don't smoke at all.) If you have a sore or burn on either hand, keep it covered with a bandage, and keep the sore away from foods. Also, take off jewelry such as rings and bracelets before starting to make a meal. They provide good places for bacteria to congregate.

Keep the refrigerator clean, and check the temperature occasionally. The main part of your refrigerator should be no warmer than 40 degree

Fahrenheit, and the thermometer in the freezer should register no more than zero degrees Fahrenheit.

Use clean utensils at the start and wash them with soap and warm water after each use. Likewise with the cutting board. All equipment that is handled or comes in contact with food should be washed between each step of preparation. This includes the counter tops and that little blade on the automatic can opener.

STORAGE

The simple rule is: Keep hot foods hot and cold foods colds. The danger temperature zone - in which bacteria and other microorganisms propagate best - is from 40 F to 140 F. Wrap and cover foods that you put in the refrigerator so they won't leak. Make sure that neither the refrigerator nor freezer areas are so stuffed that air can't circulate. Poor circulation will cause temperatures to rise.

Don't let cooked or refrigerated foods such as meats and salads sit around at room temperature. Remember, the bacteria in some foods can double in 20 minute. However, dry foods should be kept at 60 F to 70 F.

Store hot leftovers in small, shallow containers. That will hasten cooling. If the food cools too slowly, bacteria can multiply. For the same reason, leftover meats should be cut into slices of three inches or less.

REHEATING AND THAWING

To be sure that harmful microorganisms in foods to be reheated are destroyed, always reheat to at least 165 F.

Thaw foods as quickly as possible, but *never* thaw frozen foods at room temperature. The safe ways to thaw are:

•in the refrigerator, or in a bath of ice cubes in the sink or a large tray.

•under cold, running water.

•in a microwave oven.

•as part of the cooking process.

When that grandest of bureaucrats, Mother Nature, wrote the rules on food poisoning, she threw in one loophole for bacteria. She allowed all of the harmful ones to be tasteless, colorless and odorless. So, we can't always rely on our eyes or noses to tell us if what we're preparing will be welcomed by our stomachs.

And one other thing about The Lady: She seems to be rewriting the rules all the time. As a result, we find new pathogens (disease-producing organisms), or some old ones that have lain relatively dormant may suddenly stir up trouble.

All of which makes following the rules we know about that much more important.

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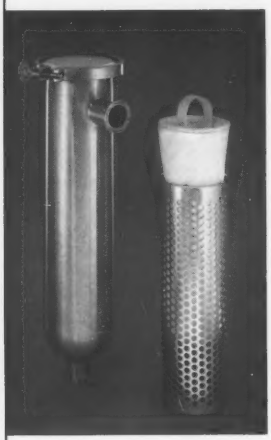

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Are Pesticides Friend or Foe?

The only way food service professionals and other consumers can answer that question is by learning more

Elaine McLaughlin, M.S., R.D.
United Fresh Fruit and Vegetable Association
Reprint from School Food Service Jounal/January 1988

When you think of pesticides, what image does it conjure up?

"I feel positive about pesticides," says Wanda Grant, food service director of Federal Way School District near Seattle, Wash. "Pesticides are needed to control bacteria and insects in fresh produce. You can't keep fresh fruits and vegetables on the market year round without them."

Pesticides also allow consumers to obtain an excellent product, according to Myrna Rowe, food service director and dietetic technician of Pasco School District in Washington. "Realistically, we need them to produce a quality product," she says, explaining that in her rural community people have a healthy respect for pesticides.

The public usually only hears about the dangers of pesticides - is this accurate or just a small part of the big picture? As food service professionals serving the nation's future generation, it is important to know the whole story about them.

What are pesticides?

Being informed begins with knowing exactly what a pesticide is. Federal law defines a pesticide as "any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest."

About 13 percent of all pesticides are sold for home and garden use. These include household cleansers, bleaches, pet flea collars, rat poisons and insect repellents.

Industry, such as water treatment plants, accounts for 20 percent of pesticide use. Another 14 percent are used by institutions such as restaurants and hospitals to control germs and insects.

Agriculture and forestry account for the remaining 53 percent.

Who needs them?

The most obvious benefits of pesticide use are low-cost and abundantly available, attractive fruits and vegetable. According to a U.S. Office of Science and Technology Policy study, pesticides allow farmers to produce an average increased crop yield of 36 percent. This helps meet the needs of the world food supply.

Are they safe?

No chemical can be "proven" safe. As stated by M. Alice Ottoboni, Ph.D., author of *The Dose Makes the Poison,* at some dose, any substance has an adverse effect - even aspirin and sugar have dangerous levels.

Normal exposure to pesticides is extremely minute. With advanced technology residues are detectable at extremely low levels. Even though such small levels are measurable, no one can evaluate their significance.

Taking this into consideration, federal guidelines for application have built in a broad margin of safety. Many food service directors are confident in the safety of the food supply, but encourage staff to follow sensible sanitation procedures.

"My employees wash the products and their hands thoroughly," Rowe says. "Washing produce usually takes any chemicals off that have adhered to the product. I have a greater fear of bacteria on people's hands than I do of pesticide residues."

She adds she feels confident in the federal government's role of setting and policing guidelines that ensure consumers' safety.

What laws regulate pesticide use?

Pesticide residues in food are regulated by the Federal Food, Drug and Cosmetic Act and Federal Insecticide, Fungicide and Rodenticide Act. The Environmental Protection Agency's Office of Pesticide Programs registers pesticides licensed as safe after passing extensive tests and reregisters old pesticides to assure they meet current standards. New pesticides are tested 10 to 15 years prior to EPA approval.

Where can consumers turn for more information?

One source of further pesticide information is the

National Agrichemical Program, developed by the United Fresh Fruit and Vegetable Association.

"Our goal is to provide information to our members and the media for consumers," says Claudia Fuquay, director of the National Agrichemical Program, Congressional Relations.

"I think consumers should relax. The federal government closely monitors the use of pesticides. People need to be more informed about the regulations, how they are enforced and the research that is being done to ensure that they are safe. If people knew specifics, they would have more confidence in our food supply."

John Wessel, director of FDA's Contaminants Policy Staff, adds that produce is safe and compliance to pesticide regulation should not be a concern.

"I can speak from the food products that we sample," he says. They comply with the standards that we set...Pesticides are expensive. Farmers use bare bones when they are applying them. They are careful as to how they select and use them."

According to Grant, she is leery of produce grown without pesticides. "A while back I bought some produce that was grown organically from a local farmer," she says. "There were insects in the cabbage. There were weevils in the apricots. I believe there are more health hazards without pesticides because of infestation by pests."

Lester Crawford, administrator of USDA's Food and Safety Inspection Service, says all consumers should have confidence in the safety of pesticides and should be better informed.

"People don't seem to realize that they must trade the worm in the apple for a safe, beautiful product by using pesticides," he adds.

For more information about pesticides, send a legal sized, self-addressed, stamped envelope to the United Fresh Fruit and Vegetable Association, Dept. "P", Box 1339, Alexandria, VA 22313.

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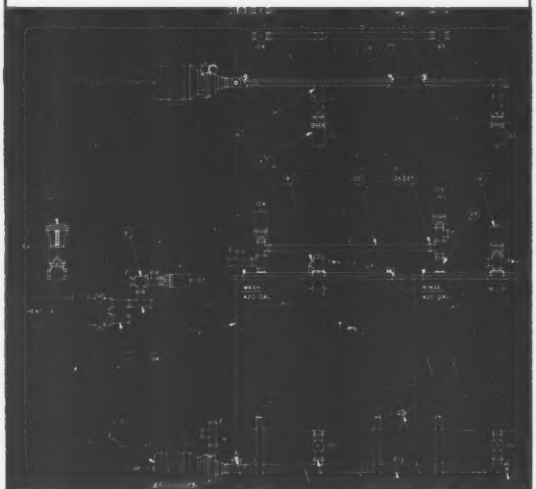

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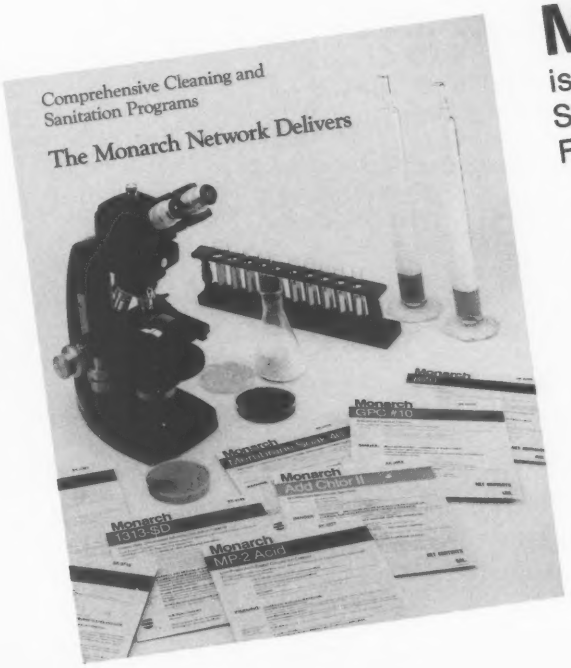

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Selling Nutrition:

Should Food Packages Carry Health Messages?

(Reprint from FDA Consumer/November 1987)

Food products could carry health messages on their labels, so long as the information is true and certain criteria are met, under a recent proposal by the Food and Drug Administration.

In proposing the new policy in the *Federal Register* last August 4, FDA said it "believes that it is important to consider ways to improve the public's understanding about the health benefits that can result from adhering to a sound and nutritious diet.... The rapid growth of scientific and public interest in nutrition argues for recognition and dissemination of such new knowledge, and food labels offer one appropriate vehicle for this dissemination."

FDA cited three principal factors for proposing the change in its present policy:

•The growing amount of scientific evidence suggesting that there is a link between diet and various illnesses, such as cancer and coronary heart disease, and that people can reduce their risk of those diseases by eating more or less of various types of foods.

•Consumers' interest in learning more about how to improve their diets, avoid diet-related illnesses, and generally stay healthier.

•Food industry interest in marketing and promoting products for their potential health benefits.

Consumers More Aware

As the agency noted, consumers have become "increasingly conscious of the relationship between diet and health," and food manufacturers have been interested in finding ways to convey to consumers "how specific foods may be used to improve one's diet, thereby promoting good health,"

For years, FDA used its legal authority - and the courts - to prohibit the food industry from making specific health claims on the labels of food products, especially those it felt were fraudulent, misleading, unproven, and potentially hazardous to public health. The agency took the position that foods with health claims were either misbranded under the law or that the claims made on labels amounted to drug claims whose safety and effectiveness had to be demonstrated.

FDA's basic authority stems from provisions of the federal Food, Drug and Cosmestic (FDC) Act and various regulations that spell out how industry must present nutrition information on food labels and rule out certain types of claims.

"While effectively protecting the public from fraudulent, unsubstantiated, and potentially dangerous claims, the law, regulations, and past legal precedent in this area have also had the effect of generally discouraging use of any health-related messages on food labeling," the agency said in its August proposal.

Criteria Listed

The proposal lists four criteria to determine the "propriety of health-related claims and information." The criteria, it stressed, would not change the agency's basic interpretation of the requirements of the FDA Act or the legal precedent established from earlier court cases involving false or misleading claims. The criteria are:

•The health messages or claims made on food labels must be truthful and not misleading to consumers, and they "should not imply that a particular food [can] be used as part of a drug-like treatment or therapy-oriented approach to health care." Further, the information "must not overemphasize or distort the role of a food" in promoting good health.

•The claims must be supported by "valid, reliable, publicly available scientific evidence ... and should conform to generally recognized medical and nutritional principles" for a sound, total diet. The "weight of scientific evidence" must support a health claim to ensure that the "substance of the message has achieved sufficient [scientific] recognition to be appropriate and nonmisleading."

•The claims must indicate clearly that good nutrition is the result of the total diet and not a result of eating a specific food or foods. That requirement conforms to the traditional advice of most nutrition experts that people

should eat a varied but balanced diet of nutritious foods.

Nutrition labeling would be mandatory on any product making a health claim. In general, the purpose of the nutrition label is to inform consumers about the amount of calories, protein, carbohydrate, fat, sodium, and certain essential vitamins and minerals present in each serving of a product. In 1973, FDA began requiring manufacturers to include nutrition information if a nutrition claim is made on the label or if a nutrient is added to the product. Also, a regulation to specify how information on fat and cholesterol content should be present on food labels was proposed by FDA in November 1986.

To supplement this nutrition labeling information and make it more meaningful to consumers, FDA over the years has conducted public education campaigns on sodium, cholesterol, and overall nutrition.

Market Impact Studied

The potential impact of being able to market foods with specific health messages was clearly demonstrated by the Kellogg Company, which, in October 1984, launched an aggressive, nationwide advertising campaign that promoted the merits of a high-fiber, low-fat diet for reducing the risks of some kinds of cancer. The message was endorsed by the National Cancer Institute (NCI).

The package labeling for Kellogg's All-Bran and other high-fiber Kellogg cereals carried a message in the form of "preventative health tips from the National Cancer Institute." Stating the NCI "believes eating the right foods may reduce your risk of some kinds of cancer," the label advised consumers to eat a well-balanced diet - including foods low in fat and high in fiber and fresh fruits and vegetables - and to maintain proper weight.

The Kellogg promotion was the subject of a study in the July-August 1987 issue of *Public Health Reports*, a journal of the U.S. Public Health Service. The study was done by Alan S. Levy and Raymond S. Stokes, who are with the division of consumer studies in FDA's Center for Food Safety and Applied Nutrition.

The study found Kellogg's campaign was effective in boosting sales of high-fiber cereal products, such as Kellogg's All-Bran, to the detriment of low-fiber cereals. For more on the study's findings, see "Selling High-Fiber Cereals" in the Updates section of the September 1987 *FDA Consumer*.

The regulation proposed last August acknowledged that FDA has no pre-market approval authority concerning health messages. "Manufacturers may make health-related claims on food labels that conform to these guidelines without prior approval, with the understanding that, if a manufacturer fails to adhere to the criteria, the product and the manufacturer's activity may be subject to regulatory action," FDA said. The agency said it would be willing to meet with any manufacturer who wants to "consult with the agency on health-related claims before making changes in existing labeling."

In addition, the proposed regulation provides for the formation of a government committee to develop examples of the kinds of health messages that would be acceptable under the new criteria. The panel would be chaired by the commissioner of FDA and include representatives of other Public Health Service agencies and the Food Safety and Inspection Service of the U.S. Department of Agriculture. The Federal Trade Commission also would participate in a liaison capacity. The suggested health messages, which would be published in the *Federal Register*, could be used by food manufacturers if they so choose.

FDA stressed that its jurisdiction applies only to health claims on food labels, since FTC has primary jurisdiction over food advertising. "Food advertising which is not labeling will continue to be regulated by the Federal Trade Commission," FDA said. Similarly, health claims for meat and poultry products fail under the jurisdiction of USDA. FDA said it would work closely with these and other agencies on issues involving public health messages.

Public Comment Sought

Allowing the food industry to use food labels as a means of communicating health-related messages, FDA acknowledged, could raise "complex legal and procedural concerns."

"The agency believes that, if proper criteria are followed, it is possible to use the food label to communicate more explicit health-related information," FDA said. However, the agency also made it clear in its August announcement that it was seeking public guidance in the formulation of its new health claims policy. For example, the proposed regulation specifically requests public comment on:

Whether it is in the public interest to permit health information, including information on specific diseases, to appear on food labels.

Whether the proposed criteria are reasonable.

How much scientific evidence a manufacturer would need to support a health claim or message.

What priority FDA should give to any future enforcement actions "against the use of therapeutic or misleading health-related information on food labeling."

Whether there is "sufficient scientific data and information" to support the use of health claims on dietary (vitamin and mineral) supplements.

Limited Use Seen

The proposed regulation would permit manufacturers of vitamin and mineral supplements to market their products with health messages or health claims, if the claims met the proposed criteria. However, FDA said that it probably would be more difficult for dietary supplements to meet the criteria because of a general lack of scientific data linking dietary supplement use to improved health, other than in preventing nutrient deficiency diseases.

"Although supplements are useful for individuals

suffering from particular nutrient deficiencies, the available scientific information and data regarding good nutrition and health ... focus primarily on the role of traditional [or conventional] foods, not dietary supplements," FDA noted.

This position is supported by the *Dietary Guidelines for Americans*, published by USDA and FDA's parent Department of Health and Human Services. The guidelines stated that people who eat a wide variety of foods rarely have to take a vitamin or mineral supplement and that "there are no known advantages to consuming excess amounts of any nutrient."

The principal exceptions to this general advice are women who are in their childbearing years, are pregnant, or are breastfeeding, the elderly and "very inactive" people, and infants with special nutritional needs. In all instances, the guidance of a physician or dietitian is recommended.

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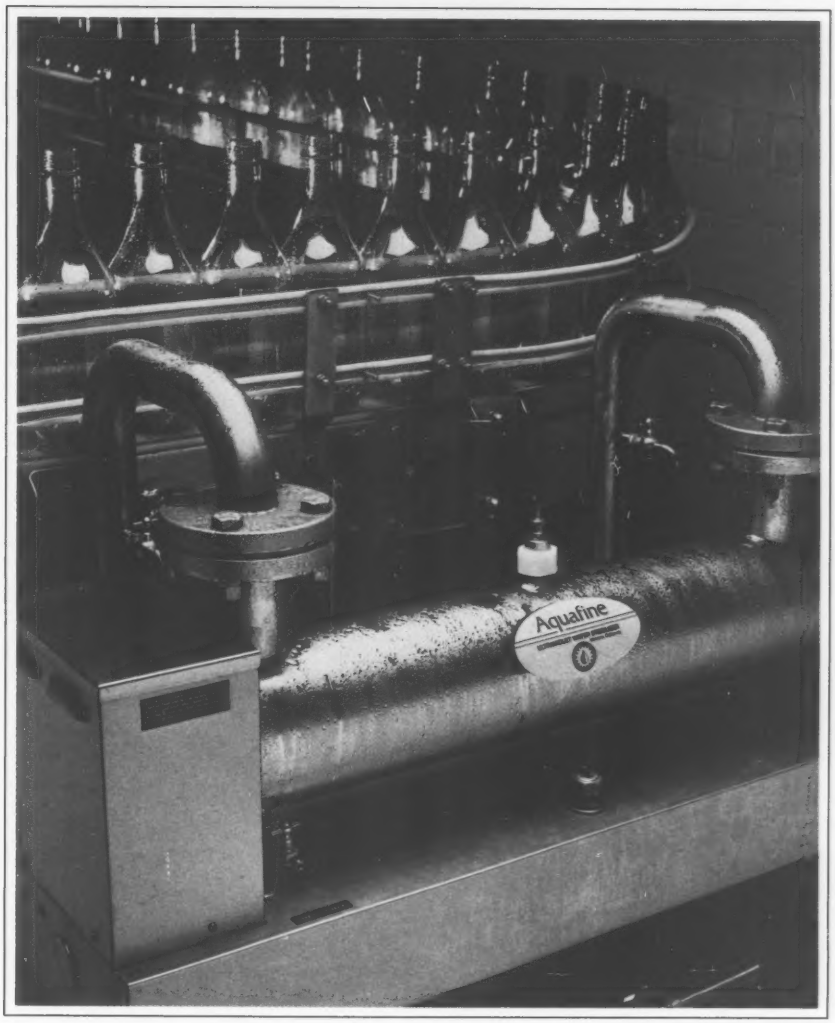

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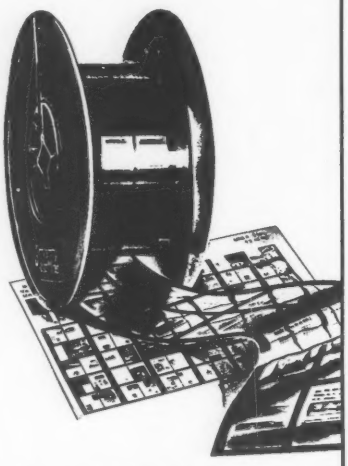

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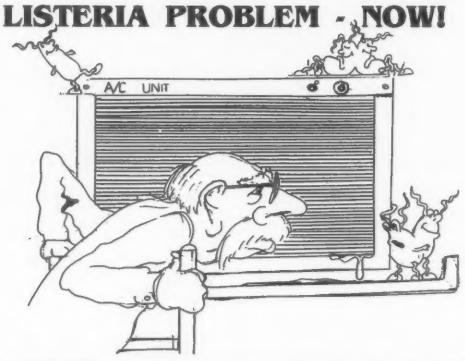

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News and Events

Damien A. Gabis

NEW IAMFES Secretary

Damien A. Gabis through vote of the IAMFES membership will begin his term on the IAMFES Executive Board in August, 1988.

Damien Gabis is presently the President of Silliker Laboratories, Inc. in Chicago Heights, Illinois. In adjunction with Silliker Labs., Damien is an associate professor working in the Biology Department with the Illinois Institute of Technology in Chicago, Illinois. Prior to his work in Chicago, he was a bacteriologist on the Board of Health in Steubenville, Ohio.

Damien received his Bachelor's degree from the College of Steubenville, Ohio in Biology and his Master's degree from the University of Kentucky in Dairy Science-Bacteriology. He continued on to receive his Doctorate from North Carolina State University in Food Science-Microbiology.

Damien has a long list of publications and presentations. He is a member of several committees and others professional public service groups such as: the American Assoc. of Cereal Chemists Committee on Microbiological Methods, American Council of Indpenedent Lab, Food and Drug and Agriculture Committee, a member of IFT, and a Graduate Student Adviser with the Biology Dept. at Illinois Inst. of Technology. He has been a member of IAMFES since 1974.

Seafood Processing and Sanitation Tapes Available

Want to improve your processing plant's sanitation and processing procedures? Training your employees should be the first step.

To help the plant manager train employees -- five valuable video tapes will soon be available from the National Fisheries Institute. The newest training tape is titled "Pest Control in Seafood Processing Plants."

The 26 minute tape covers procedures to control flies, roaches, mice, rats and other common pests associated with food processing operations.

Other seafood processing training tapes that are available and are planned for the near future include:

"Blue Crabmeat Pasteurization" - Available now - A 20 minute training videotape explains how Blue Crab processors can produce a safe, wholesome pasteurized crabmeat product. An excellent "how to" film and a "must" for the Blue Crab meat producer.

"Container Seam Evaluation" - Available now - A 32 minute training videotape explains to the processor how to conduct a "tear down" and analyze for possible can seam defects. This videotape is specifically geared toward the seafood canner who thermally processes seafood.

"Smoked Fish Processing" - Available in Sumner 1988 - This videotape will cover the basic operations necessary to safely and properly smoke fish, including raw product handling, brining, drying, smoking and packaging and distribution.

"Personal Hygiene" - Available in Summer 1988 - This videotape will address the importance of proper personal hygiene habits as an integral part of an overall sanitation program. Emphasis is placed on illustrating the significance and control of microbes, filth and other possible food contaminants. The program is designed to help processors meet the requirements of FDA's Good Manufacturing Practice Regulation.

"Plant Cleaning and Sanitation" - Available late 1988 - This videotape wil discuss how to properly organize an effective in-plant cleaning and sanitation program. Aspects of plant cleaning covered include: dry clean up procedures; washing, including types of cleaners, and cleaning systems; sanitizing; and follow-up monitoring of the cleaning operation.

The tapes are produced in cooperation with the Virginia Polytechnical Institute, Blacksburg, Virginia. All tapes are available in both 1/2" VHS and Beta formats and can be purchased for $49.50 each (includes postage and handling). Orders may be directed to Roy Martin, Vice President, Science & Technology, National Fisheries Institute, 2000 M St., NW, Suite 580, Washington, DC 20036. 202-296-5170.

National Mastitis Council Meeting Held in Reno

The National Mastitis Council (NMC) held it's annual meeting February 8-10 in Reno, Nevada. J. Woodrow Pankey, Ph.D., research scientist at the University of Vermont, was elected president of NMC. Pankey served as Vice President of NMC in 1987. Dr. Paul D. Thompson, President of Dairy Equipment Co., Madison, Wisconsin, was elected Vice President. In this capacity, Thompson will serve as program chairman for the 1989 NMC annual meeting to be held in Tampa, Florida. John B. Adams, Director of Regulatory Affairs, National Milk Producers Federation, Arlington, Virginia, was re-elected Secretary/Treasurer.

The National Mastitis Council works to enhance the quality of milk and dairy products through educational and research efforts aimed at mastitis control. Members of the organization include all segments of the dairy industry with an interest in the production of high quality milk. By bringing these groups together, NMC provides the industry with a national forum to address the problems of mastitis and related milk quality concerns.

For more information, contact the National Mastitis Council, 1840 Wilson Blvd., Arlington, VA 22201. 703-243-8268

Osteoporosis Prevention Begins with Diet

Women, especially those over 40, are most likely to have osteoporosis, a crippling bone disease. So it's only fitting that Osteoporosis Prevention Week begins on Mother's Day, May 8.

"Preventing osteoporosis begins, but doesn't end with a good diet," says Dr. Mary Kinney Sweeten, a nutritionist with Texas A&M University's Agricultural Extension Service. "Exercise, genetics, and estrogen have also been shown to affect the occurrence of this disease."

"For the past several years, prevention efforts have focused on getting people to consume enough calcium-rich foods beginning in childhood, to slow down the rate at which bones lose calcium as a natural part of aging," she says.

"Research studies show that most adult women are consuming less than two sevings, and teenagers are getting less than the four servings of dairy products they need each day," adds Sweeten.

Calcium supplements have grown in popularity because women are concerned about inadquate diets, but the nutritionist says supplements may not be the best solution.

"Calcium doesn't work alone in the body," she says. "Since other nutrients are needed to help absorb the mineral, eating a wide variety of foods is recommended."

For example, Sweeten reports that research conducted by the U.S. Department of Agriculture's Human Nutrition Research Center has documented the influence of the element boron in calcium absorption and in regulating the nutrients and hormones involved in bone building.

After switching from a very low boron intake to an ample intake of 3 milligrams per day, the women participating in the studies lost 40% less calcium.

"The average daily intake of boron is estimated to be 1.5 milligrams. Yet 3 milligrams can be easily gotten by eating lots of fruit, especially apples, pears and grapes, and eating leafy vegetables, nuts and legumes," the nutritionist says.

She maintains that a balanced diet which includes dairy products, protein foods, fruits and vegetables and grain products each day can supply adequate amounts of nutrients.

While good nutrition and adequate calcium intake is the key to osteoporosis prevention, Sweeten says women can also take other steps to help avoid the disease.

"Regular exercise is important for keeping bones healthy. Weight-bearing exercise, such as walking, will lead to denser, stronger bones."

"Giving up smoking is also important, since besides heart disease and lung cancer, smokers are also at greater risk for developing osteoporosis," she remarks.

The nutritionist says that post-menopausal women may also want to consult with their physicians regarding estrogen therapy, since loss of the hormone can lead to increased risk of osteoporosis.

Contact: Mary Kinney Sweeten, 409-845-1735 for more information.

Copesan Offers Complimentary Pest Control/Sanitation Newsletter

The "Copesan Pest Control and Sanitation Newsletter" is now available to managers of businesses involved in food and beverage productions, distribution and storage. Published by Copesan Services, Inc., Milwaukee, Wisconsin, the quarterly newsletter provides current information on preventive pest control, sanitation techniques, insights on government regulations and on related industry issues. It is written by a noted pest control industry consultant, C. Douglass Mampe, M.S., Ph.D.

There is no charge for subscriptions.

Copesan Services is the world's largest network of privately-held, full-service pest control companies. Copesan provides pest control and sanitation services for regional and national businesses throughout the United States, Canada, Mexico and the Carribean.

For more information, contact: Dan Rankin at 414-476-1181, or write: Copesan Services, Inc., 2949 N. Mayfair Rd, Milwaukee, WI 53222.

Dr. Emil Mikolajcik Recipient of the ACDPI Research Award

Dr. Emil Mikolajcik, Department of Food Science and Nutrition, Ohio State University received the 1988 American Cultured Dairy Products Institute (ACDPI) Research Award sponsored by Nordica International at the Institute's recent conference in Newport Beach, California. The award, consisting of a permanent plaque and a $1,000 check, is given annually to a college professor whose research has significantly benefited the cultured dairy foods industry.

L to R: Tedd Wittenbrink (recent ACDPI Board Chairman), Meadow Gold Dairies; Fran Lavicky, Nordica International; 1988 Research Award recipient Dr. Mikloajcik; Earl Carter (ACDPI Board Chairman), Holland Dairies, Inc.

According to Institute Vice President/Secretary Dr. C. Bronson Lane, the March 13-16 Annual Meeting received high marks from the 230 individuals from processing and supply concerns throughout the United States and Canada.

For more information contact C. Bronson Lane, P.O. Box 547813, Orlando, FL 32854-7813, (305) 628-1266.

Meat Industry Must Change to Meet Consumer Needs

The red meat industry needs "a new creative offense" to meet the nutritional needs of consumers, according to an associate director of the University of Minnesota's Agricultural Experiment Station.

Consumer demand for "lite" foods and more emphasis on preventive health care and diet are "extremely positive changes for consumers and the meat industry," said C. Eugene Allen, who is also dean of the University's College of Agriculture.

"At times, all of us associated with the red meat industry have been too defenisive about fat, cholesterol and saturated fatty acids," Allen said March 23 in a talk to the Midwestern Section Meeting of the American Society of Animal Science in Des Moines, Iowa.

"Even though we were not wrong on a number of issues, we probably missed some opportunities because of a defensive posture. For example, it's surprising that the red meat industry is only now beginning to market the branded beef concept when societal changes have suggested it for some time.

"The entire food and meat industry needs to work together. There's nothing to be gained in the long term by intense species competition based on marginal claims of differences in nutritional value," he said.

"Consumers have become more calorie conscious, while at the same time meat producers and processors are providing significant new retail products. We need more interaction among meat producers, educators and those concerned with human health.

"Meat producers and processors need to increase investments in research and development if red meat products are to remain attractive and competitive for consumers. The research needs to start with improving our understanding of the basic biology of livestock and fundamentals of meat processing.

"They extend to successful marketing of new or improved products that have meat or its constituents as a major part of the product," Allen said.

"The initiative of the dairy industry to significantly increase funding for public research on dairy products is an example of a commitment by a commodity group. This should be closely examined by the red meat industry as a coordinated effort among species," he said.

For more information contact Gene Allen, 612-624-5387.

Thomas Knopp is the Winner of the ACDPI Student Essay Contest

Winner of the fifth American Cultured Dairy Products Institute Student Essay Contest is Thomas Knopp (R), a dairy/food science major at Ohio State University. Mr. Knopp, who was provided an all expense paid trip to the Institute's 1988 Annual Meeting in Newport Beach, California, presented his paper at this event, and was given a $500 cash award. Dr. Charles White (L), Dairy Science Professor at Mississippi State University, is Chairman of the Student Essay Contest Committee.

For more information contact C. Bronson Lane, P.O. Box 547813, Orlando, FL 32854-7813, (305) 628-1266.

ATTENTION: Environmental Health Professionals and Industry

Basic Supervision and Basic Management, Part I and Part II, considered as a unit, has been approved as designated courses in supervision for ten CEU's or 100 hours of training credit. The courses are designed to train environmental health practitioners and food industry supervisors and managers who have been promoted from technician to supervisor or who are seeking supervisory responsibility. The courses are accredited by the environmental quality departments and the public health departments in Alaska, Georgia, Idaho, New York, Texas, Wyoming and Washington. They are also accredited by the American School Food Service Association.

These award winning, highly practical correspondence courses can be utilized to improve the skills of *supervisors and managers* in dealing with people and people-type problems. Over 3,200 individuals have enrolled in the *Basic Supervision and Basic Management* courses. Because of this volume of courses, Kendall Hunt Publishing Company, Customer Service, 2460 Kerper Blvd., Dubuque, IA 52001, Phone 1-319-588-1451, will now handle the materials production, while Indiana State University will continue to be responsible for the professional process including grading and issuing of certificates and CEU's.

These courses present over 200 problem areas which are faced by the individual in his daily work. They were derived from thirty-two years of experience of Dr. Herman Koren, Professor of Environmental Health and Safety and Coordinator of the Environmental Health Program at Indiana State University. He has served in a great variety of work assignments including supervision, management and consulting positions, and has utilized this practical knowledge, understanding of people, and research skill to develop these courses. He is also author of the textbooks, *Environmental Health and Safety, Vol. I and II*, Pergamon Publishing Company; Fairview Park, Elmsford, NY, which is currently being used worldwide.

For further information contact Dr. Herman Koren, Professor of Environmental Health and Safety, Indiana State University, Terre Haute, IN 47809. When writing please include your name, address, and telephone number, or call 812-237-3077.

Death of Steven J. James

We are saddened to announce that Steven J. James, FDA, Milk Safety Branch, Washington, DC passed away during his sleep on the night of April 13 in Jackson, Mississippi where he was assisting and conducting a training course on pasteurization tests and control.

Steven is survived by his wife Marilyn, two sons, John and Jeff, who reside at 15 Brooks Ave., Gaithersburg, MD 20877, and a daughter living in Colorado.

A memorial scholarship fund has been established for the children's education by the Kantrell Funeral Home, Kimball, NE 69145.

Don't Ignore Unseen Hazards From Termites & Carpenter Ants

"Out of sight, out of mind," is a dangerous philosophy when dealing with termites. These common pests are rarely seen or heard as they eat their way through life, but the destruction they cause is too great to be overlooked.

"Each year termites cause more than $750 million in property damage," says Dr. George Rambo, R.P.E., Director of Research, Education and Technical Resources for the National Pest Control Association, "and that's more than tornadoes, hurricanes and other windstorms combined. They are by far our costliest structural pests."

Termites abound in every state except Alaksa and may be more visible at this time of the year when young termites emerge from their colonies in mating swarms. "But even if you don't see a swarm, " warns Rambo, "don't be lulled into a sense of false security. Your home could be infested with termites or even carpenter ants and you would never see a swarm."

Many people tend to confuse carpenter ants with termites but explained that these ants can actually do as much or more harm than termites. Unlike termites, carpenter ants don't eat wood as food but instead excavate galleries as homes. Their colony may nest in unsound or moist wood in your home or somewhere outside, merely entering your house to forage for food. Once either pest begins burrowing in the woodwork of your home, however, its destructive habits can weaken structures and cause hundreds, if not thousands, of dollars worth of damage.

Of all household pests, termites and carpenter ants are least susceptible to a do-it-yourself treatment. If you think that you might have a termite or carpenter ant problem, chances are you'll need professional help in identifying and eliminating the pests.

Because they burrow deeply into wood and often work undetected behind the walls of your home, they're both hard to locate and difficult to get rid of without proper equipment.

"If you suspect a problem," says Rambo, "don't delay calling an expert to check out the situation. Putting it off will only give pests time to entrench themselves more deeply and do more damage."

The National Pest Control Association warns that termites and carpenter ants are often undetectable to the untrained eye, but suggest looking for these telltale signs of a pest problem:

-Piles of wood debris ejected by carpenter ants when carving out galleries;

-Large black (sometimes black and red) ants seen foraging for food in the kitchen, pantries, etc;

-Swarms of winged insects, other than bees, around the outside of your home;

-Obvious damage to wooden timbers in your home;

-A distinct, dry rustling sound which can be heard behind walls under *very* quite circumstances.

When seeking professional help, look for a firm that is a member of the national, state or local pest control association. These are established businesses which, through their association membership, have access to the latest technical information on chemicals, pests and treatment techniques.

For more information on "How to Select and Use A Pest Control Firm" write to the National Pest Control Association, 8100 Oak Street, Dunn Loring, VA 22027. Please enclose $.25 for handling, and a stamped, self-addressed, legal-size envelope.

Neogen Aflatoxin Testing Method Receives AOAC Approval

The Association of Official Analytical Chemists (AOAC) has approved the Neogen method for aflatoxin detection. It is the only immunoassay method for mycotoxins to receive the association's approval.

Aflatoxins are a type of mycotoxin (mold toxin) that are present in many commodities and final products, including; corn, peanuts, small grains, cottonseed, feeds and peanut butter. The toxins are known to cause many health problems in livestock, and have been found to be carcinogenic in laboraotry studies.

The U.S. Food and Drug Administration has set a regulatory action level for the presence of aflatoxins in foods and feed at 20 parts per billion.

The Neogen method for aflatoxin detection received Interim Official First Action Approval in a decision on April 1, 1988. The method was developed and is produced by Neogen Corporation, a Lansing, MI based biotechnology company. It is one of several mycotoxin diagnostic kits manufactured by the company and marketed under the trade name Agri-Screen .

Approval of the Neogen method was the culmination of two years of collaborative studies by 15 AOAC collaborators in the U.S. and seven other countries. The Associate Referee was Dr. Douglas Park, formerly of the U.S. Food & Drug Administration (now with the University of Arizona). The study was jointly sponsored by the AOAC and the International Union of Pure and Applied Chemistry (IUPAC).

AOAC is a scientific organization whose membership is composed of scientists, U.S. federal and state government regulatory officials, academic and industry laboratories world-wide. AOAC coordinates collaborative studies and gives official approval to acceptable methods. The organization's approval is accepted by virtually all U.S. federal, state and foreign authorities.

The approval of an immunoassay test for mycotoxins represents a breakthrough for both science and industry. Prior to the approval of the Neogen method of testing for mycotoxins, only chemical-based testing methods, such as Think Layer Chromatography (TLC) and High Performance Liquid Chromatography (HPLC) were AOAC approved methods for mycotoxin detection. Chemical methods generally require highly specialized laboratory equipment and hazardous chemicals to test for aflatoxin.

The Neogen method, on the other hand, requires no specialized equipment or hazardous chemicals. Aflatoxin-specific antibodies are used to pinpoint alflatoxin. The test can be run not only in the laboratory, but in the field and on-site locations as well. The method takes less than 10 minutes from start to finish.

The AOAC study tested the Neogen method for screening aflatoxin in mixed feed, cottonseed, cottonseed meal and.ammoniated cottonseed during collaborative studies. The results of the tests on these products were the basis for AOAC's Interim Official First Action Approval.

The Agri-Screen test for Aflatoxin is part of a complete line of mycotoxin diagnostic kits marketed by Neogen Corporation. Other Agri-Screen diagnostics include tests for Aflatoxin M-1, Zearalenone, T-2 Toxin, and Vomitoxin. Early research on the method was conducted in collaboration with Professors James Pestka and L.P. Hart, of Michigan State University.

Neogen Corporation is a six-year-old, privately-held biotechnology firm. The company develops and markets products for the diagnosis and prevention of diseases in plants and animals, using new procedures made possible through biotechnology.

For more information contact Renee Howard, 517-372-9200.

Calming An Overactive Appetite

Millions of Americans have been biting off more than they should chew and spending millions more trying to lose the excess pounds that result.

"Several factors can contribute to overweight, including lack of exercise, a high-fat diet and genetic background, but simple overeating is the primary problem for many people," says Dr. Alice Hunt, a nutritionist with Texas A&M University's Agricultural Extension Service.

According to Hunt, researchers have found that some people's appetites are more easily stimulated than others' by external cues, such as the presence of food.

Although both overweight and normal weight people may respond to food cues by overeating, normal weight people still manage to regulate the amount of food taken in over the long term so that their weight remains about the same.

"People who want to lose weight, but have been unsuccessful, should consider their reactions to the sight, smell or thought of food," she remarks.

Researchers at the Obesity Research Clinic at the University of Pennsylvania advise overweight people to ask themselves five questions to find out whether they are easily influenced by external cues:

Do you feel like eating dessert when it looks appetizing even after eating a large meal?

Is there always room in your stomach for something you like?

Do you get excited by the possibility of eating at a buffet?

Does driving by a bakery or fast-food outlet and smelling the food make you want to eat regardless of when you ate last?

Do you want to eat when you see a picture of a delicious dessert in a magazine?

"An overweight person who answers to any or all of those questions may want to find ways to reduce exposure to food and food cues to help his or her appetite remain dormant," Hunt says.

"Keeping high-risk foods out of the house, or at least out of sight, gives you enough time to ask whether a craving is the result of real hunger."

The nutritionist concedes that a dessert or other appetite-stimulating food can't always be avoided and that an occasional lapse will not ruin a weight-loss diet.

"The problem for someone with a hard-to-control appetite is stopping after one helping of the food," she says. "But the dieter who is aware of how external cues affect his or her eating, will take one portion and then put the rest away before sitting down to eat it."

For more information, contact: Alice Hunt, Texas A&M University, 409-845-1735

Commercial Rennet Unlikely Source of Listeria Contamination

Cheesemakers need not be concerned about Listeria monocytogenes in commercial rennet extract, according to the University of Wisconsin-Madison food microbiologists E.H. Marth and F.E. El-Gazzar. The extract contains benzoic acid, which is "very unfriendly" to Listeria monocytogenes, as a preservative, Marth said. Rennet extract should be Listeria-free by the time it reaches the cheese factory.

Since rennet extract comes from the stomachs of suckling calves, there's a chance that the raw extract may be contaminated if an animal harbored Listeria. Marth and El-Gazzar inoculated three lots of commercial rennet extract from four levels of Listeria, ranging from 1,000 to 10 million cells per milliliter (30,000 to 300 million cells per fluid ounce). They stored the samples at 7 C (45 F), a temperature at which most antimicrobials aren't very active, and a common storage temperature for rennet extract.

Listeria inocula of 1,000 cells/ml (30,000 cells/oz) and 10,000 cells/ml (300,000 cells/oz) were usually gone after 14 days, and always gone after 28 days. At levels of 100,000 cells/ml (3 million cells/oz) or 10 million cells/ml (300 million cells/oz), which rarely occur outside the lab, the inocula sometimes survived for 28 days, but never after 42 days of refrigerated storage.

"Rennet extract, once it has gone through shipping and distribution networks, is held long enough to inactivate Listeria," Marth concluded. However, there are plenty of other ways for the pathogen to find its way into a milk plant. Reseachers have found Listeria in everything from silage to cabbage.

The bacterium has caused illness and death among people who ate contaminated products such as shredded cabbage, milk and Mexican-style cheese made in California. Listeria has been implicated in a number of dairy-product recalls nationally.

Most of the recalled products were probably contamianted after pasteurization. Marth offers these checklists for dairy plant operators who'd like to keep Listeria out of their products and processing areas:

Areas to check for post-pasteurization problems:

* Cross-connections
* Cleaning and sanitizing effectiveness
* Cleanliness of piping
* Filling and packaging
* Handling of returned and reclaimed product
* Cleanliness of heating, ventilation and air-conditioning systems
* Sources of aerosols
* Refrigerated storage areas

Walls, floors, ceilings and floor drains should be cleaned and sanitized regularly. Coolers should receive particular attention. Listeria can grow at refrigeration temperatures, and these areas often are not routinely cleaned and sanitized.

Normal traffic can spread Listeria throughout the plant. To avoid this:

* Restrict access to dairy processing areas
* Keep street clothes out of the plant; keep dairy clothes in the plant
* Keep milk haulers and all unauthorized people out of processing areas
* Install and use footbaths containing disinfectant

Remember that raw milk can introduce Listeria into the factory. New milk must be handled carefully to prevent contamination of the factory and finished product.

Clean-up personnel must know how to properly clean and sanitize dairy plant equipment and the surrounding environment. Keep records of these activities.

Marth also recommends routine sampling for coliforms, using results as an index of post-pasteurization and contamination. If the plant quality-control lab finds coliforms, review cleaning and sanitizing procedures.

Dairy plant quality-control labs should *never* test for Listeria. Outside commercial labs should handle this job.

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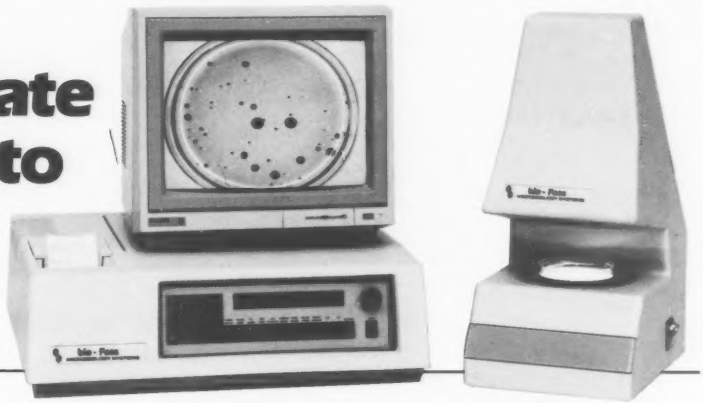

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New Product News

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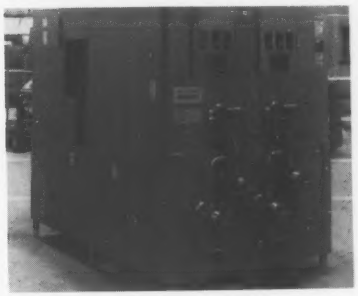

New Ice Cream Freezer with Accos Microprocessor Control

•A new ice cream freezer with simplified microprocessor control is offered by APV CREPACO. The freezer includes several important product and labor saving features. Three electronic controllers very accurately maintain the setpoints of mix flow, overrun and viscosity. These three process variables can be set at the freezer or by remote signal from a central computer or remote control panel; and for computer integrated manufacturing, the unit can be electronically interlocked with downstream filling, molding or extruding equipment.

The user-friendly ACCOS 3 PLC microprocessor and easy to understand pushbutton panel automate all freezer sequences such as valves, pumps, dashers and refrigeration for startup, shutdown or hold, thus freeing the operator for other duties. When used with a central computer, the ACCOS management information system can record events, track downtime and calculate yields.

The new ice cream freezer also features APV CREPACO's Kwik-Fill, Kwik-Clean pumps for rapid startup, changeover, and simplified CIP, with pump drives built into APV CREPACO's innovative "Works-In-A-Drawer" for ease of inspection and maintenance.

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Wilden Pump & Engineering Company

•The Wilden "Champs" are a series of engineered plastic air-operated, double-diaphragm pumps. The Champ is test proven for handling corrosive, abrasive, and viscous liquids for the industry.

This series is now available in four sizes: the M1, a 1/2 inch pump for flows from 0-14 GPM, the M2, a 1 inch pump for flows from 0-35 GPM, the M4, a 1 1/2 inch pump for flows from 0-73 GPM, and the M8, a 2 inch pump for flows from 0-150 GPM.

Materials of construction available are: Polypropylene, known for its chemical and moderate heat resistance; P.V.D.F. (polyvinylidine fluordie), known for its exceptional chemical and good heat resistance; Teflon P.F.A., available in M1 and M4 sizes, can be combined with a patented teflon diaphragm or any other Wilden diaphragm to meet any pumping requirement within the Wilden flow range.

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Lease-A-Lab

•Looking for an answer to the problem of fitting new lab equipment into your tight budget? HEMCO introduces the Lease-A-Lab program featuring the UniLab, a new concept in pre-engineered modular room design that can be quickly assembled to fit your exact space requirements. Typical applications include environmental rooms for quality control testing, isolation/containment rooms for lab procedures, and clean rooms for micro-electronic manufacturing/assembly and pharmaceutical processing/packaging.

UniLabs for the Lease-A-Lab program may be ordered fully equipped with lighting, ventilation, casework, countertops, fume hoods, and electrical and plumbing services, or as an enclosure only with equipment to be leased/purchased separately.

Use of the HEMCO Lease-A-Lab program generates savings and profits.

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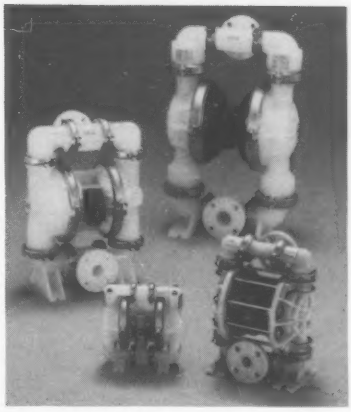

New Head Space Oxygen Analyzer

•Systech Instruments, Inc. is pleased to announce the introduction of the new ZR891 Head Space Oxygen Analyzer.

The ZR891 is ruggedly constructed, simple to calibrate and requires no special operator skills. The same instrument may be used to measure oxygen levels from 0.01 ppm to 100%.

With various sampling systems that are available, the ZR891 is capable of measuring the head space in a wide range of containers, both flexible and rigid. Sample size may vary from 1cc to larger samples.

Instantaneous results are shown on a digital display. Optional recorder outputs are also available.

No periodic maintenance is required and all instruments carry a one year warranty.

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The Hako Minuteman Explosion Proof and Dust Ignition Proof Vacuum

•Hako Minuteman, Inc. has just introduced their exclusive UL listed series of explosion proof and dust ignition proof vacuum cleaners. UL listing is for Class I, Group D atmospheres containing specific organic vapors and fumes and for Class II, Group G atmospheres containing flour, starch and grain dusts. The four model series is standard 15 gallon, constructed of heavy duty 22 gauge non-sparking stainless steel. Wet and dry recovery is optional. Hako Minuteman is the first manufacturer to introduce an explosion proof and dust ignition proof vacuum with a H.E.P.A. filter. The exclusive copoly H.E.P.A. filter is rated 99.99% efficient at 0.12 microns and is standard with a manometer assembly. UL listed explosion proof tool kits are available.

The vacuum system is ideal for the asbestos abatement and hazardous materials industries for use in petroleum refining facilities, petro chemical plants, plants manufacturing and using organic coatings, petroleum dispensing areas, solvent extraction plants, utility gas plants, fuel servicing areas, grain elevators, manufacture and storage of flour or starch, feed mills, etc.

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A Successful Alternative to Soak-Down Sterilization

•Dairy and food production areas must be sanitized at regular intervals. Many times this is a cumbersome and wasteful procedure done with high volume liquid sprayers.

The Clarke Outdoor Spraying Company, Inc. has successfully applied an electric micro droplet application system, which is portable, easy to operate, and very effective.

By using micro droplets, a thin layer of sanitizing material covers all surfaces in a room without the costly and time consuming need of a wipe-down. Many very difficult areas to sanitize, such as pipes located high in a production room or blocked by tanks and other obstructions, are completely covered and then simply air dried in a very short period of time.

This portable, ready to use, system has been in operation for over a year at one of our nations largest ice cream and dairy product plants.

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Customized Homogenizer With Aseptic Capability

•A high pressure 5000 psi, three cylinder homogenizer with aseptic capability is engineered to handle liquids with entrained particles that require abrasion resistant materials and design. The special unit, manufactured by APV CREPACO, is portable and includes a variable speed motor for variable capacity as well as digital speed indicator and digital amperage indicator to monitor input and to assure repeatability and accuracy of the drive system.

Also featured are replacable suction and discharge valve seats and a type SPB solid homogenizer valve designed for abrasive products and extended wear life. For the ultimate in processing flexibility, two-stage homogenization, high pressure features and aseptic design options can be supplied. The unit is of all stainless steel construction with full stainless steel enclosure.

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Flexible Packaging for Longer Shelf Life

•The shelf life of foodstuffs and drinks sensitive to oxygen and/or moisture can be extended by packaging in a line of highbarrier films and laminates from Britain. CAMVAC films and laminates can be tailored precisely to the properties needed. Multi-ply composites of a wide range of metallized films, including polyesters, polypropylenes, polyethylenes and nylons can be supplied in widths up to 2.2 meters (7.3'). Oxygen permeabilities can start very low and moisture vapor transmission rates can be close to zero, offering a barrier comparable to aluminum foil but with good resistance to pinholing when flexed to be applied.

The laminates have a bright metallic appearance which is receptive to print, so that attractive and eyecatching graphics can be applied. Triple laminates, offering the highest barrier, can be supplied with different thickness and seal characteristics. They are particularly suitable for bag-in-a-box wines and offer a 12-month shelf life.

Bilaminates are suitable for vacuum-packing applications, pouches or box liners. A cost-effective alternative to foils or rigid containers, they include materials with various sealing characteristics; all offer high strength and flex resistance combined with good barrier properties.

The films and laminates are produced in one of Europe's most advanced plants for metallizing plastic materials. A 2.2 meter (7.3') width capability covers barrier materials from the smallest snack-food product up to liners for 1.1 ton-capacity intermediate bulk containers for food and drink.

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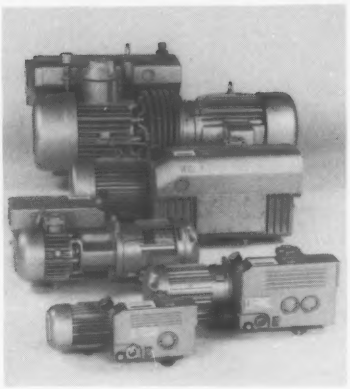

Busch, Inc. Features R5 Series Vacuum Pumps and Systems For Laboratory Applications

•Busch pumps are capable of handling most chemical laboratory applications where belt drive pumps are currently used. Belt drive pumps are usually selected because they have large oil sumps that become contaminated less quickly than hi-vac direct drive pumps. Busch direct drive pumps are designed to operate at temperatures that permit most gases and water vapor to pass through the pump without contaminating the oil. This assures successful operation and longer pump life.

Considered one of the most rugged and dependable vacuum pumps in the world market, these single-stage, air-cooled, direct driven units are used to provide vacuum for distillation, filtration, extraction, degassing, drying, etc. in laboratory applications.

They are available in 14 sizes from 3.5 to 1130 DFM displacement and come in two models: the R5 Standard for rough vacuum applications (end vacuum to 29.3" Hg or 15 Torr), and the R5 Super for the fine vacuum applications (end vacuum to 29.9" Hg or 0.5 Torr).

A nationwide network of distributors, representatives and service centers throughout the United States, Puerto Rice, and Mexico supply and service your laboratory vacuum needs.

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Electrophoresis Source Book

•ICN Biochemicals has published an Electrophoresis Source Book, with a complete listing of ultra pure chemicals and reagents for electrophoresis work. Included are products for polyacrylamide and agarose electrophoresis, isoelectric focusing, protein blotting/transfers, affinity purification of proteins, and many other reagents used in all electrophoresis applications.

The Electrophoresis Source Book is organized in sections, with products listed under their applications, such as cross-linking reagents, buffers, stains and dyes, etc. Also featured are electrophoresis kits, pre-mixed buffers and specialty reagents. Products include descriptions and specifications, as well as standard packaging and prices.

The Electrophoresis Source Book is only available from ICN Biochemicals.

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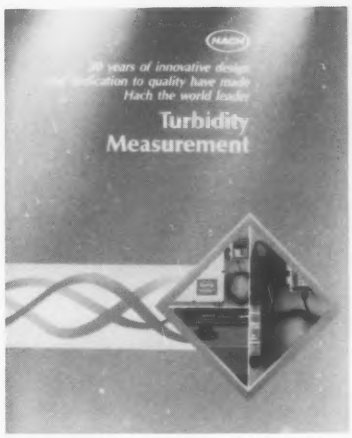

New Turbidimeter Catalog

•Hach Company, the world leader in turbidimeter manufacturing, announces the publication of a new 32-page catalog entitled *Turbidity Measurement*. The catalog features Hach's full line of on-line, laboratory and portable turbidimeters as well as a wealth of technical information about turbidity measurement and standards, and turbidimeter applications.

Included in the catalog are Hach Company's latest turbidimeters:

•The 1720C Digital Low-Range Turbidimeter for continuous monitoring of high quality filtered water.

•The Surface Scatter 6 Turbidimeter for monitoring streams with high solids concentrations.

•The Ratio /XR for accurate turbidity measurement regardless of sample color.

For a free copy of *Turbidity Measurement* (#3081), circle number 263.

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Keep One Hand On Technology with the Pocket Pals

•1986 saw the advent of the first Pocket Pals, DSPH-1 and DSPH-3, one and three range conductivity and pH meters manufacturerd by the Presto-Tek Corporation, Los Angeles. Their success has paved the way for an entire series of instrumentation designed for lab accurate, one hand sample testing, in the field, plant or lab.

The pH-2, one of the 8 meters now available is an ideal low cost pH meter for most general purpose pH measurements in the plant, field, production line, or lab. The unique package provides easy one hand operation and economy. Simply insert the pH probe into sample to be measured for instant pH readings. pH probes are user replaceable and can be charged in a matter of minutes.

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JOIN THE DAIRY INDUSTRY IN EXPLORING NEW DIRECTIONS!

Even an industry with a long history and proud heritage must keep an eye on the future — a future in which it can remain strong and dynamic. Step into the future with the dairy industry at this year's premier event: the International Dairy Show in Orlando, Florida, October 16-19, 1988.

The International Dairy Show, sponsored by the Milk Industry Foundation and the International Ice Cream Association, offers a new opportunity for the dairy industry. For the first time, dairy foods processors and their suppliers will be united in their own trade event structured around their particular needs and interests.

Full Range of Exhibitors

The 1988 International Dairy Show is more than just a table-top trade show. Nearly 200 leading suppliers of industry equipment, ingredients, and materials will exhibit in an atmosphere designed to stimulate processor/supplier exchange. Come meet your suppliers. See the latest products and most innovative technologies, and discuss the issues that face today's dairy industry.

A Show—and More!

Over twenty-five educational workshops—including extending shelf life of perishable dairy products, fat and sweetener substitutes, tamper-evident packaging alternatives, and computer efficiency—will be offered in conjunction with the Show. The combination of exhibits and information sessions sets the Show apart and makes it a wise investment for your company. Invest in the future—of both your company and the dairy industry—by attending the 1988 International Dairy Show.

The International Dairy Show, sponsored by the Milk Industry Foundation and International Ice Cream Association, will be held at Marriott's World Center in Orlando, Florida, October 16-19, 1988. For more information call or write: MIF & IICA, 888 16th Street, NW, Washington, DC 20006, (202) 296-4250.

1988 International DAIRY SHOW

October 16-19, 1988
Marriott's Orlando World Center
Orlando, Florida

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Food and Environmental Hazards to Health

GIARDIASIS IN BRITISH COLUMBIA

In 1986, giardiasis was the most commonly reported enteric infectious disease in British Columbia. The highest rate for this disease occurred in the 0-4-year age group, followed by the 5-9-years old. The lowest rate of illness was found in the elderly and 10-19-year age group. The sex ratio was approximately equal in those 5-59-years old, with males predominating those <5 years of age and females in those 40 years of age and over.

The total number of reported giardiasis cases and the incidence rate per 100,000 has almost doubled over the last 5 years. This is true even when the "excess" cases reported from the East Kootenay and South Okanagan Health Units during 1985 and 1986 are removed from the totals. These cases were associated with outbreaks involving contaminated water systems in Creston and Penticton, respectively. The collected date indicate that sporadic cases and outbreaks of giardiasis have been more frequently recognized during the last 5 years, and that the increasing trend cannot be explained by the known outbreaks alone. Because the data are based on "reported cases", it is also possible that more complete reporting together with increased recognition has contributed to this trend. These factors may also vary by geographic location.

When the same data are summarized by health unit, there are 9 out of 21 units which exceed the provincial average rate. It is interesting to note that the 2 areas which had recognized outbreaks in 1985 and 1986 would have had rates higher than the provincial average even with the "excess" cases excluded from the calculations. These data suggest an association between a high "background" rate of infection and the occurrence of an outbreak.

In summary, this review of reported giardiasis cases in British Columbia indicates the following:
(1) the most commonly reported enteric infectious diseases is giardiasis.
(2) the reported incidence of giardiasis has almost doubled over the last 5 years.
(3) this increase has involved both sporadic cases and outbreaks, and
(4) the reported incidence is highest in the Okanagan, Kootenays, and the North regions, the same areas where outbreaks have occurred.

This review suggests that the control of giardiasis should be a priority. Some cases have been associated with contaminated community water supplies, but the reasons for the majority of the cases remain unclear. A major case-control study currently being conducted may help to define a cause and suggest preventive strategies.

Can Dis Weekly Rept 11/28/87

BOTULISM ASSOCIATED WITH AN INFLIGHT MEAL - ENGLAND

As described in an earlier issue (CDWR 1987; 13:159), a case of botulism was diagnosed in a 49-year-old male following consumption of a kosher meal, prepared in Switzerland, aboard an airplane travelling from Nice to Heathrow. The diagnosis was confirmed by the PHLS Food Hygiene Laboratory, Colindale who demonstrated a very high titre (approximately 500 MLD per mL) of Type A **Clostridium botulinum** toxin in the patient's serum as well as both a low titre (1-2 MLD per mL) of toxin and **C.botulinum** type A in gastric aspirate. Paralysis has been severe and artificial ventilation is still required.

All foods eaten in the 48 hours before leaving France were freshly prepared and were unlikely to have been the source of intoxication. These foods were all shared by the 3 other members in the patient's family who have had no illness. The inflight meal was packed with different foods in separate sealed containers. One dish, rice and vegetable salad, was described as smelling offensive on opening the containers. The patient ate a small amount of this salad but discarded the bulk because of foul taste. No others ate this salad an no remains of the meal were available for testing.

Microbiological examination of similar packaged meals from the same source has not yielded **C.botulinum** in any food nor has toxin been detected. However, a variety of **Bacillus** species, including a thermophile at 2 x 10^5/gram, have been detected in rice and vegetable salads by the Food Hygiene Laboratory, as well as by other laboratories. Airlines voluntarily withheld shelf-stable meals from the same source during investigations. Swiss local health authorities have visited and inspected the production plant. No other cases have been reported.

Can Dis Weekly Rept 11/28/87

NATIONWIDE DISSEMINATION OF MULTIPLY RESISTANT SHIGELLA SONNEI FOLLOWING A COMMON-SOURCE OUTBREAK-UNITED STATES.

In early July 1987, an outbreak of multiply-resistant **Shigella sonnei** gastronenteritis occurred among persons who attended the annual Rainbow Family gathering in North Carolina (CDWR 1987; 13:146). Since that time 4 clusters of gastroenteritis due to multiply resistant **S. sonnei** have been reported among persons who had no apparent contact with gathering attendees.

Can Dis Weekly Rept 11/28/87

LISTERIA AND FOOD PROCESSING

Listeria monocytogenes is a microorganism that only within the past three to five years has been recognized as a health endangering pathogen. This organism was first discovered in the early 1900's and has been isolated from sheep, swine, cattle, goats as well as many other species of animals and birds, insects, fish, water, green plant material, soil, sewage and silage. **Listeria** can be isolated from almost anywhere!

Not all humans are susceptible to infection by **Listeria**. In fact, normal healthy individuals' natural immunity can fend off a Listeria infection with mild flu-like or no symptoms. Humans must be immunocompromised in order to develop an infection. Examples of immunocompromised people include pregnant woman, patients undergoing chemotherapy for cancer treatment or humans taking immunosuppressive drugs to fight inflammatory responses or organ transplant rejections.

Listeriosis in susceptible people can cause flu-like symptoms, meningitis or even death. Pregnant woman can give birth to stillborn babies or spontaneously abort their fetuses. In cattle, a listeric infection can cause circling disease whereby the animals circle endlessly in one direction or another before dying. Other cattle may only sustain a subclinical infection and hence appear normal and healthy. Both infected cattle and humans can shed Listeria through their feces and cows have been shown to shed this microorganism into milk during lactation.

The **Listeria** organism is a gram positive rod that appears in chains growing in the shape of a "V" or "Y". It grows best in reduced oxygen environments (Microaerophilic). Although its temperature range for growth is from 35 to 115° F and its pH range is from 5.0 to 9.6, it can survive in environments outside of these ranges. The psychrotrophic nature of Listeria, that is its ability to grow at refrigeration temperatures not only distinguishes this organism from most other pathogens, but makes it more difficult to control. Hence, the old adage of keeping food products cold to prevent problems may no longer be applicable with regards to **Listeria.** In addition, this bacteria has been found to be somewhat salt tolerant and able to survive over a fairly wide water activity level.

Technics/Topics October 1987.

FOODBORNE LISTERIOSIS - SWITZERLAND

Several cases of listeriosis which occurred in this country have been attributed to the consumption of soft cheese of the "Vecherin Mont d'Or" type. The federal health authorities have recalled all stocks of this type of cheese, a specialty of Vaud Canton produced only from September to January. Exportation of this cheese has also been stopped.

This type of cheese can be characterized as follows: cylindrical in shape, with a diameter 12-32 cm, a height of 4-5 cm and a weight ranging from 500 g to 3 kg; the rind has reddish smears, and the pale yellow inside gets runny when fully ripe. The cheese is surrounded by a strip of fir-tree bark before being packed into a wooden box.

No other types of cheese are affected by these public health measures, but the Federal Office of Health has decided to thoroughly check all other types of soft cheeses available on the market. Any cheese found to be contaminated with **Listeria monocytogenes,** the pathogenic agent for listeriosis, will also be withdrawn from the market.

Editorial Note: The decision taken by the Swiss Federal Office of Public Health to withdraw from the market a type of cheese implicated in several cases of listeriosis, gives added interest to the decision taken some time ago by the World Health Organization (WHO) to convene an international Working Group on Foodborne Listeriosis in Geneva from 15 to 19 February 1988.

The Group, made up of experts in this field from France, the Federal Republic of Germany, the Netherlands, Switzerland, the United Kingdom, the United States of American and Yugoslavia, will be reviewing the most recent information on foodborne listeriosis. The Group will draft recommendations for national authorities on consumer protection; other recommendations will be directed to the food industry and research institutions. In this way, an internationally coordinated action in response to this emerging public health problem is most likely.

Can Dis Weekly Report

INTOXICATION FOLLOWING MUSSEL INGESTION

As of 11 January 1988, a total of 135 cases of mussel intoxication had been reported. Eighty-two of these experienced gastroenteritis and 53 had both gastrointestinal and neurological symptoms. Twenty-three (58%) of the 40 reported cases 60 years of age and over had both gastrointestinal and neurological symptoms. Ages of cases have ranged from 20 years to over 80. Thirty-three of the total cases required hospitalization.

Can Dis Weekly Report

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Synopsis of Papers for the 75th Annual Meeting

Abstracts of papers to be presented at the 75th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. to be held in Tampa, Fl., July 31-August 4, 1988.

Synthesis of Heat Shock Proteins and Thermotolerance in Bacterial Cells and Their Problem in Thermal Processing of Food, *T. Tsuchido* and M. Takano,* Department of Fermentation Technology, Osaka University, Suita, Osaka 565, Japan.

The heat resistance of food spoilage bacteria varies with how to apply heat to food which is contaminated with bacterial cells. Cells of *Escherichia coli* and *Staphylococcus aureus*, grown in M9 supplemented with glucose and Casamino acids and Trip-Soy broth, respectively, were found to increase their resistance to heat at 50°C and 55°C, by being incubated previously at a lower constant temperature or by being heated with a temperature rise in an incubator. The increase in heat resistance was defined here as the thermotolerance of cells. Chloramphenicol inhibited, but partially, the thermotolerance. During the preincubation process and the rising temperature process, cells produced so-called heat shock proteins, which have been suggested to contribute to the cellular thermotolerance, as detected by polyacrylamide gel electrophoresis and fluorography. It is likely that the production of heat shock proteins is responsible for the protein-synthesis dependent thermotolerance, although protein-synthesis independent thermotolerance remains to be investigated. The thermotolerance of cells may evoke a problem in certains of thermal process of pasteurization.

Survival of *Listeria monocytogenes* in ground beef or liver during storage at 4° and 25°C, *Leora A. Shelef* and Loretta A. Monte,* Dept. of Nutrition and Food Science, Wayne State University, Detroit, MI 48202.

Survival and growth of *L. monocytogenes* strain Scott A (SA) were studied in freshly ground beef or liver during storage at two temperatures of 4° and 25°C. Cells were enumerated at various periods by surface-plating appropriate dilutions on Plate Count Agar and on two selective media, McBride Listeria Agar (MLA) and Cyclohexanedione-Nalidixic Acid-Phenylethanol Agar (CNPA) of Jay. Plates were incubated at 35°C for 48 h. The aerobic counts in the fresh samples were ca. 10^4 CFU/g, and the SA inocula were 0.7-1 x 10^5 CFU/g. Total aerobes in ground beef stored at 4°C were >10^8 after 2 weeks, while in liver the background flora increased at a slower rate (10^6 CFU/g after 17 d). Colonies of *Listeria* were counted and selected colonies were confirmed biochemically. Recovered numbers remained unchanged during a storage of over 30 d in either ground meat or liver. Storage at 25°C and testing after 4, 8, 12 and 24 h confirmed recovery but absence of multiplication of the organism. This study demonstrated survival of *L. monocytogenes* in refrigerated ground meat or liver during storage from freshness to spoilage by the natural microflora, although multiplication was not evident. It is also demonstrated the need for selective *Listeria* media for meats. No difference was observed in survival of the organism, despite differences in composition and spoilage pattern of meat and liver.

Fungi Isolated from Citrus Products, *M. E. Parish* and D. P. Higgins,* University of Florida, IFAS, Citrus Research and Education Center, 700 Experiment Station Road, Lake Alfred, FL 33850-2299.

A variety of citrus products, including dried pellets, frozen concentrated orange juice (FCOJ), irradiated FCOJ, unpasteurized orange juice, and packaging for chilled orange juice, were qualitatively assayed for their fungal microflora. Samples were from commercial and non-commercial sources. Yeast identifications were based on standard taxonomic procedures and published identification keys. Molds were identified using macro and microscopic comparisons with literature descriptions and illustrations. Fungi identified were *Aspergillus niger, Aspergillus* sp., *Aureobasidium pullulans, Brettanomyces lambicus, Byssochlamys* sp., *Canida maltosa, Candida sake, Cladosporium* sp., *Fusarium* sp., *Geotrichum* sp., *Hanseniaspora guilliermondii, Hanseniaspora* sp., *Penicillium* sp., *Pichia membranaefaciens, Rhizopus* sp., *Rhodotorula* sp., *Saccharomyces cerevisiae, Schwanniomyces occidentalis, Torulaspora delbrueckii* and *Trichoderma* sp.

A Modified Plating Technique for Enumeration of Stressed Salmonella, *A. A. Airoldi* and E. A. Zottola,* University of Minnesota, Department of Food Science and Nutrition, 1334 Eckles Avenue, St. Paul, MN 55108.

A plating technique that would allow for recovery and enumeration of stressed *Salmonella typhimurium* was developed. Enumeration of *S. typhimurium* cultures, freshly propagated in tryptic soy broth (TSB) at 37°C for 18-24 hr or xylose lysine desoxycholate (XLD), Hektoen enteric (HE), Salmonella-Shigella (SS), and brilliant green (BG) agars resulted in recovery of 10^1 and 10^2 fewer cells than when tryptic soy agar (TSA) was used as the plating medium. This decreased recovery on selective media was not observed when *S. typhimurium* was pour plated in TSA, allowed to stand at room temperature for 4 hr, overlaid with XLD, BGA, SS or HE and incubated at 37°C for 48 hr. These media retained their selective and differential properties when modified plating technique was used. *Staphylococcus aureus* was inhibited, and *Enterobacter cloacae* was easily differentiated from *S. typhimurium* when mixed cultures were used. In addition, the population of freshly propagated *S. typhimurium* was determined, and the cultures were placed at -20°C for 1-2 wks. The number of viable cells decreased as a result of freezing. Plating of frozen samples on selective media in the traditional method showed reduced recovery on XLD, BGA, HE and SS as compared to recovery on TSA. Use of the overlay technique allowed for recovery with the selective media at the same level as when TSA was used. Use of the modified plating method appears to allow for recovery of injured cells and would be useful when enumeration of S. typhimurium is required.

Affiliate Newsletter

Delegates from Texas to China

The Texas Department of Health is pleased to announce that two Division of Milk and Dairy Products employees, Mr. Al Votion, R.S. and Ms. Janie F. Park, have been selected to lead a 20 - 30 member delegation to the People's Republic of China in 1989. This delegation, sponsored by the People to People organization, will be comprised of leaders in the fields of milk, food and environmental sanitation, who will participate in seminars at various locations within China and each will address the seminar in his/her field of expertise. The group will spend at least 2 weeks in China. Topics concerning milk production and processing, food preparation and storage, water hygiene, solid waste management, general sanitation practices and food production will be emphasized on this trip.

Mr. Votion and Ms. Park were recommended for their co-leadership positions in the People to People program by the staff of the International Association of Milk, Food and Environmental Sanitarians. This recommendation was based, largely, upon the earlier successes they have encountered with the Texas Association of Milk, Food and Environmental Sanitarians/Food and Drug Adminsitration/Texas Department of Health's cooperative "Basic Pasteurization Courses" and "Advanced Milk Sanitation Courses" which they organized and continue to adminster.

Persons interested in participating in the delegation to China should contact Janie Park, 1100 West 49th St., Texas Department of Health, Austin, TX 78756. 512-458-7281

Affiliate Calendar

1988

September 16, GEORGIA ASSOCIATION OF FOOD AND ENVIRONMENTAL SANITARIANS FALL SYMPOSIUM, will be held at the Holiday Inn, I-20 East, Snapfinger Wood Dr., Decatur, GA. The THEME is "Seafood and Public Health." For more information contact Steve Petrides, GAFES Secretary Div. of Environ. Hlth, 3651 Market St., Clarkston, GA 30021, (404) 292-1979.

September 20-21, WISCONSIN ASSOCIATION OF MILK AND FOOD SANITARIANS JOINT EDUCATIONAL CONFERENCE, will be held at the Ramada Inn, 2325 Bainbridge Rd, LaCrosse, WI 54601. For more information, contact: Ron Buege, West Allis Hlth Dept., 7120 W. National Ave., West Allis, WI 53214, (414) 256-8360.

September 26-28, INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC., Annual Fall Meeting will be held at the Hilton in Fort Wayne, Indiana. The contact person is Rosemarie Hansell, Marion Co. Hlth Dept., 222 East Ohio St., Indianapolis, IN 46204, (317) 633-9682.

September 27-29, NEW YORK STATE ASSOCIATION OF MILK AND FOOD SANITARIANS Annual Meeting, will be held at the Sheriton Inn-Binghamton at Sarbro Square, One Sarbro Square, Binghamton, NY. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004, (716) 937-3432.

September 29-30, SOUTH DAKOTA STATE DAIRY ASSOCIATION, will hold its annual convention at the Holiday Inn, Brookings, SD. For additional information, contact: Shirley W. Seas, Dairy Science Dept., SD State Univ., Brookings, SD 57007, (605) 688-5480.

October 6, OHIO ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS FALL MEETING, will be held in Columbus, OH.

October 18-19, CALIFORNIA ASSOCIATION OF DAIRY & MILK SANITARIANS CONFERENCE, to be held at the Concord Hilton Hotel, Concord, CA. For more information, contact: Jack Coppes, Executive Secretary, PO Box 9234, Whittier, CA 90608, (213) 699-4313.

November 1-3, NORTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL FALL CONFERENCE, to be held at the Holiday Inn, Minot, ND. For more information, contact: Peri Dura (701) 224-2382.

Audio Cassettes of the IAMFES 75th Annual Meeting

Convention Recordings International Inc., will have audio cassettes available for sale at the Annual Meeting July 31 - August 4. The cost is $7.50 at the meeting or $8.50 including shipping. For more information write or call: Convention Recordings International Inc., 13030 Starkey Rd., Suite 5, Largo, FL 34643, 813-581-2196.

IAMFES

MEETING REGISTRATION FORM

75th IAMFES Annual Conference
July 31 - August 4, 1988
Hyatt Regency Westshore
Tampa, Florida

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NOTE: PRICES LISTED ARE FOR *MAIL REGISTRATION POSTMARKED BY JUNE 15, 1988.*

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30 or 50 Year Member _____
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SPEAKER _____

PRICES GOOD WHEN POSTMARKED BY JUNE 15, 1988
Prices after June 15 are $5.00 higher for each registration and each function. Registrations postmarked after June 15 must include higher prices.

SECTION 1

Date	Registration	IAMFES MEMBER	SPOUSE/GUEST (not company representative)	STUDENT	NON-MEMBER	*Registration & IAMFES Membership for 1989	BEST BUY
7-31	Early Bird Reception	☐FREE	☐FREE	☐FREE	☐FREE	☐FREE	
8-1	Gasparilla Celebration	☐$29	☐$29	☐$29	☐$29	☐$29	Children 12 & under No._____ ☐$13.50 each
8-3	Banquet & Reception	☐$23	☐$23	☐$23	☐$23	☐$23	Children 12 & under No._____ ☐$11.50 each

*Includes Dairy and Food Sanitation

SECTION 2

— SPECIAL EVENTS —

Choose the events you wish to attend and include with your registration form above - see next page

	DAY/DATE	ADULTS	CHILDREN	How Many
Tampa by the Bay Tour	Mon. 8-1	$25.00	$12.50 (12 and under)	_____Children _____Adult
Wine & Seafood Tasting	Tues. 8-2	$5.00		limited to 50 Adults
Adventure at Busch Gardens	Wed. 8-3	$25.00	$ 4.00 (2 and under)	_____Children _____Adult
Disney World Package	Thurs. 8-4 Fri. 8-5	☐ PLEASE CHECK IF INTERESTED AND YOU'LL BE CONTACTED.		

Make Checks Payable to:
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Mail by June 15, 1988 to:
James L. Strange
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Total of Section 1 $ _____
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Overall Total $ _____

IAMFES

Special Events Program

TAMPA BY THE BAY TOUR
August 1, Monday
9:30 a.m. - 3:30 p.m.

A guided bus tour of historical Tampa, FL. Visit the University of Tampa campus including the lovely H. B. Plant Museum which was once the lavish Tampa Bay Hotel built in 1890. Shop at Hyde Park in the restored area, drive along Bayshore Blvd. where some of Tampa's finest old mansions are located. Lunch at the Colannade Restaurant over-looking the water. Browse the marketplace at Harbour Island and finally visit Ybor City, Tampa's famous Latin quarter. Here you visit historic Ybor Square located in a cigar factory built in 1886. There will be ample time for shopping in the quaint shops and you will view cigars being handrolled. Cost: Adults $25.00; Children (12 and under) $12.50.

WINE AND SEAFOOD SPECIALITY TASTING COURSE
August 2, Tuesday
3:00 p.m. - 4:30 p.m.

Spouses/Guests sign up for the Wine & Seafood Speciality Tasting Course. Cost: $5.00 per person. Course is limited to 50 people.

A DAY OF ADVENTURE AT BUSCH GARDENS
August 3, Wednesday
9:30 a.m. - 4:30 p.m.

Spend the day at Busch Gardens, The Dark Continent. Visit the fourth largest zoo in the United States, the amusement park, nature shows, and all Busch Gardens has to offer. Including Lunch at the park. Cost: Adults $25.00; Children (2 and under) $4.00.

DISNEY WORLD PACKAGES
August 4 & 5, Thursday and Friday

For those interested, 2 or 3 day post-meeting Disney World packages will be arranged by Around the Town Travel Agency, Tampa, FL. Typical packages will include transportation, park admission, and lodging at special rates. Arrangements must be confirmed no later than June 30, 1988.

SOCIAL EVENTS THROUGHOUT THE MEETING

Cheese & Wine Reception with Exhibits, Sunday Evening.
Gasparilla is a celebration of the famous pirate Gaspar. The casual affair will be fun and light-hearted with brightly colored attire. For more information contact Sonya Gambrel at 305-894-4941.
Awards Banquet & Reception, Wednesday Evening.

Make Your Reservations Early!

Hotel Reservations

IAMFES

75th Annual Meeting
July 31 - August 4, 1988
Hyatt Regency Westshore
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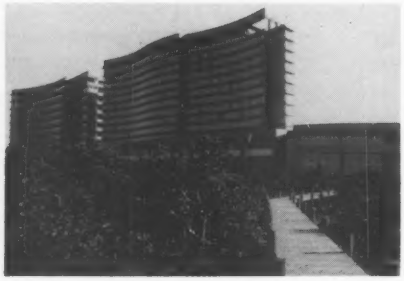
Tampa, FL 33607



The Florida Association of Milk, Food and Environmental Sanitarians (FAMFES) will be hosting the 75th IAMFES Meeting, July 31 - August 4, 1988. They cordially invite you to participate in the educational sessions as well as in social functions and special events with old or new colleagues and friends, view the table top exhibits, and enjoy Florida hospitality at the Hyatt Regency Westshore, uniquely located in a 35 acre nature preserve on beautiful Tampa Bay.

MAIL THIS FORM DIRECTLY TO:

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IAMFES MEETING
6200 Courtney Campbell Causeway
Tampa, FL 33607

QUESTIONS? CALL THE HYATT REGENCY WESTSHORE AT: 813-874-1234

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SHARING ROOM WITH _____ NUMBER OF PERSONS _____

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SPECIAL REQUESTS _____

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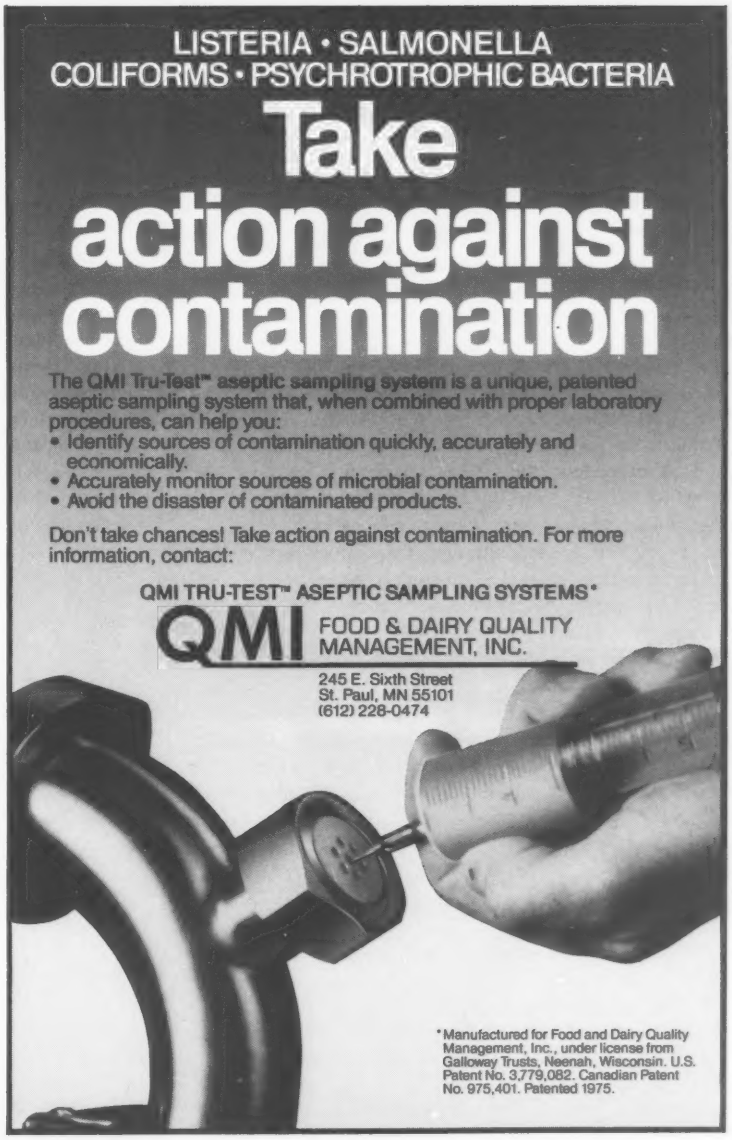
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Dairy and Food Sanitation Instructions for Authors

Nature of the Magazine

Dairy and Food Sanitation is a monthly publication of the International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES). It is targeted for persons working in industry, regulatory agencies, or teaching in milk, food and environmental protection.

The major emphases include: 1) practical articles in milk, food and environmental protection, 2) new product information, 3) news of activities and individuals in the field, 4) news of IAMFES affiliate groups and their members, 5) 3-A and E-3-A Sanitary Standards, amendments, and lists of symbol holders, 6) excerpts of articles and information from other publications of interest to the readership.

Anyone with questions about the suitability of material for publication should contact the editor.

Submitting Articles

All manuscripts and letters should be submitted to the Editor, Kathy R. Hathaway, IAMFES, P.O. Box 701, Ames, Iowa 50010.

Articles are reviewed by two members of the editorial board. After review, the article is generally returned to the author for revision in accordance with reviewer's suggestions. Authors can hasten publication of their articles by revising and returning them promptly. With authors' cooperation articles are usually published within three to six months after they are received and may appear sooner.

Membership in IAMFES is not a prerequisite for acceptance of an article.

Articles, when accepted, become the copyright property of *Dairy and Food Sanitation* and its sponsoring association. Reprinting of any material from *Dairy and Food Sanitation* or republishing of any papers or portions of them is prohibited unless permission to do so is granted by the editor.

Reprints

Reprints of an article may be ordered by the author. An order form for reprints will be sent to you. Reprints may be ordered with or without covers, in multiples of 100. Reprint costs vary according to the number of printed pages in the article. Reprints cannot be provided free of charge.

Types of Articles

Dairy and Food Sanitation readers include persons working as sanitarians, fieldmen or quality control persons for industry, regulatory agencies, or in education. *Dairy and Food Sanitation* serves this readership by publishing a variety of papers of interest and usefulness to these persons. The following types of articles and information are acceptable for publication in *Dairy and Food Sanitation*.

General Interest

Dairy and Food Sanitation regularly publishes nontechnical articles as a service to those readers who are not involved in the technical aspects of milk, food and environmental protection. These articles deal with such topics as the organization and application of a milk or food control program or quality control program, ways of solving a particular problem in the field, organization and application of an educational program, management skills, use of visual aids, and similar subjects. Often talks and presentations given at meetings of affiliate groups and other gatherings can be modified sufficiently to make them appropriate for publication. Authors planning to prepare general interest nontechnical articles are invited to correspond with the editor if they have questions about the suitability of their material.

Book Reviews

Authors and publishers of books in the fields covered by *Dairy and Food Sanitation* are invited to submit their books to the editor. Books will then be reviewed and published in an issue of *Dairy and Food Sanitation*.

Preparation of Articles

All manuscripts should be typed, double-spaced, on 8½ by 11 inch paper. Side margins should be one inch wide.

The title of the article should appear at the top of the first page. It should be as brief as possible and contain no abbreviations.

Names of authors and their professions should follow under the title. If an author has changed location since the article was completed, his new address should be given in a footnote.

Illustrations, Photographs, Figures

Wherever possible, submission of photos, graphics, or drawings to illustrate the article will help the article. The nature of *Dairy and Food Sanitation* allows liberal use of such illustrations, and interesting photographs or drawings often increase the number of persons who are attracted to and read the article.

Photographs which are submitted should have sharp images, with good contrast.

Examples of Proper Bibliographic Citations

Paper in a journal

Alderman, G. G. and E. H. Marth. 1974. Experimental production of aflatoxin in citrus juice and peel. J. Milk Food Technol. 37:308-313.

Paper in a book

Marth E. H. 1974. Fermentations. pp. 771-882. In B. H. Webb, A. H. Johnson, and J. A. Alford (eds.) Fundamentals of dairy chemistry (2nd ed.), AVI Publishing Co., Westport, CT.

Book

Fennema, O. R., W. D. Powrie, and E. H. Marth. 1973. Low-temperature preservation of foods and living matter. Marcel Dekker, Inc., New York. 598 p.

Patent

Hussong, R. V., E. H. Marth, and D. G. Vakaleris. 1964. Manufacture of cottage cheese. U.S. Pat. 3,117,870. Jan. 14.

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Stop by our Exhibit at the IAMFES Annual Meeting

Zoned Work Areas and Color-coded Brushes in Dairy Plants

Hugh Munns
Research Consultant, 6611 Markwood Drive No.,
Minneapolis, MN 55427

Milk plant managers are truly concerned about bacteria contamination in their plants and are interested in doing whatever is practical to avoid a contamination problem.

There are a number of steps that can be taken in the plant procedures to reduce the risk of bacterial contamination; one of which is a zoning program which identifies the various work areas. One might identify zones as follows:

Zone 1. Milk intake and receiving area
Zone 2. Raw milk handling and storage
Zone 3. Raw milk to homogenizing and pasteurizing
Zone 4. Pasteurized milk filler area
Zone 5. Finished product cooler storage area

The purpose of these zones is to better establish worker areas of activity and to limit their movement within these zones. For example - haulers, fieldmen, etc. should not be given full access to the plant but be limited to the intake and receiving areas. Plant employees as a whole should not move freely between the raw milk portion of the plant and the pasteurizing portion of the plant.

With zones established as such, one can then limit the use of brushes for cleaning to individual zones and further, by use of brush color coding, brushes can be identified as to the particular use intended.

For example: in zone 1, 2 and 3 red nylon brushes would be used to clean raw milk contact surfaces. Yellow brushes would be used for surfaces other than milk contact. These brushes would be stored on specially designed color coded racks and segregated by color. In the filler room (sometimes referred to as the "Clean Room") all pasteurized milk contact surfaces would be brush cleaned with white nylonbrushes and the non-contact surfaces with yellow brushes. Again, storage racks would be placed to properly segregate brushes by color and convenient to use area.

Another brush of black bristles, specifically designed for cleaning floor drains, would be designed for appropriate zones and stored independently of all other brushes.

The point of all of this is to minimize plant worker movement through the plant and to eliminate the cross use of brushes from non-contact milk surface to milk contact surfaces and from the raw milk area of the plant to the pasteurizing milk processing area. Such a zoning and a brush color coding program can be a great benefit to plant managers and superintendents in the control of bacteria contamination (example, Listeria) in their plant.

N.M.C.
NATIONAL MASTITIS COUNCIL

On-farm testing can prevent antibiotic residues

Do you realize how much of your money is spent on extra time, mileage and antibiotic testing costs? Cooperative records that the average farm call costs about $40.

What's the solution to the problem of antibiotic contaminated milk reaching the market?

The obvious answer is that antibiotics need to be prevented at the farm level. If you're unsure whether antibiotics have cleared a cow's system or if contaminated milk has been put into your tank, an on-farm test can confine the problem on the farm. Once contaminated milk leaves the farm, the problem multiples.

Testing suspect milk at the farm can prevent contamination of loads and even silos of milk. Tests available range from the official test (*Bacillus stearothermophilus* disc assay) and the DelvotestP (2 1/2 hours time), which are recognized as A2 methods by Standard Methods to three faster tests which do not detect as wide a range of antibiotics.

The *Bacillus stearothermophilus* disc assay was designed for laboratory use. Results are available in 2 1/2 hours. Equipment investment can range from $200 to $1,000; per sample cost is less than $1. The test is read by observing a zone of inhibition. This test will tell you if the antibiotic is a beta lactam (penicillins) or other inhibitor.

The Charm field test (Penicillin Assays, Inc., 36 Franklin St., Malden, MA 02148, phone 617-322-1523), requires an investment of about $1,800. Results are available in 6 minutes with a cost per sample of about $2. Besides beta lactams, this test also can check for macrolides (erythromycin) and chloramphenicol. A digital readout provides the results.

The DelvotestP (Gist-brocades USA, Inc., 5550-77 Center Drive, Charlotte, NC 28224, phone 704-527-9000), was designed for the laboratory, field or on-farm use. Results are available in 2 1/2 hours, but can be read up to 12 hours after the incubation period is over. An equipment investment of about $100 is required and cost per test is about $1. Results are read by observing a color change.

The Penzyme test (Smith Kline Animal Health Products, P.O. Box 2650, West Chester, PA 1930, phone 800-523-4835), can be run at the plant, in the field or on the farm. Results can be read in 15 minutes and require observing a color change. The equipment investment is about $100 and costs per sample are in the $2 range.

The Spot test (Angenics, Inc., 100 Inman St., Cambridge, MA 02139, phone 617-876-6468), results are available in about 6 minutes. Laboratory use is recommended. The equipment investment is about $500; cost per test is approximately $2. A texture change in observed in order to interpret the results.

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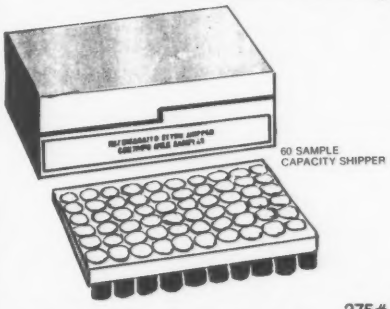

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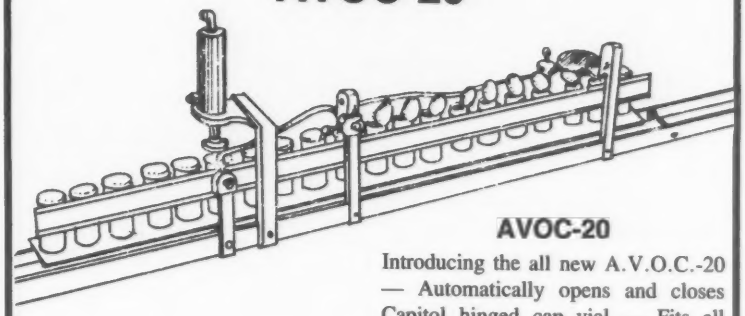

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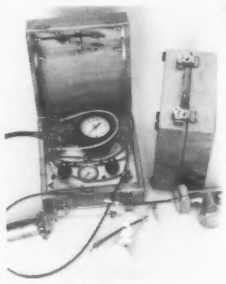

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JFP Abstracts

Abstacts of papers in the July Journal of Food Protection

To receive the* Journal of Food Protection *in its entirety each month call 1-800-525-5223, ext. A or 515-232-6699, ext. A in Iowa.

Inactivation of *Listeria Monocytogenes* by Chlorine, Souzan E. El-Kest and Elmer H. Marth, Department of Food Science and the Food Research Insitute, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 51:520-424

Cells of *Listeria monocytogenes* strain Scott-A were harvested from cultures, washed, and then treated with a solution of sodium hypochlorite at 25°C and pH 7. The cells were more resistant to chlorine when they were *(a)* harvested from a 24- rather than 48-h-old culture, *(b)* grown in tryptose broth rather than on a slant of tryptose agar, and *(c)* washed and suspended using a 20 rather than 0.312 mM phosphate buffer solution. Cells of *L. monocytogenes* were exposed for 30 s-4 h to sodium hypochlorite solutions that contained 0.5-10 ppm available chlorine. Generally, the number of survivors decreased rapidly during the first 30 s followed by a slower decrease during the rest of the exposure time. The initial count of *L. monocytogenes* in the suspension ($1x10^8$-$3.2x10^8$/ml) decreased 0.49 to 6.4 orders of magnitude during the first 30 s of exposure to the chlorine solutions. The effect of the presence of organic substances on the strength of hypochlorite solutions was studied. Presence of 0.05 or 0.1% peptone caused a large and rapid loss of available chlorine. Glucose or lactose (up to 1%) had almost no effect on the concentration of available chlorine.

Sodium Benzoate Inhibits Growth of or Inactivates *Listeria monocytogenes,* Moustaf A.A. El-Shenawy and Elmer Marth, Department of Food Science and The Food Research Institute, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 51:525-530

The ability of *Listeria monocytogenes* to grow or survive was determined using tryptose broth at pH 5.6 or 5.0, supplemented with 0, 0.05. 0.1, 0.15. 0.2. 0.25 or 0.3% sodium benzoate, and incubated at 4,13,21 or 35°C. The bacterium grew in benzoate-free controls under all conditions except at 4°C and pH 5.0. At pH 5.6 and 4°C, after 60 d, *L. monocytogenes* (initial population ca. 10^3/ml) was inactivated by 0.2, 0.25 and 0.3% sodium benzoate. Other concentrations of benzoate permitted slight growth during the first 36 d of incubation followed by a decrease in populations of the pathogen. At pH 5.0 and 4°C, from 0.15 to 0.3% benzoate completely inactivated the pathogen in 24 to 30 d, whereas the other concentrations caused a gradual decrease in the population during the 66-d incubation period. At 13°C and pH 5.6, *L. monocytogenes* grew (more at lower than higher concentrations of benzoate) in the presence of all concentrations of benzoate except 0.25 or 0.3%, which prohibited growth throughout a 264-h incubation period. Reducing the pH to 5.0 minimized growth at the two low concentrations of benzoate and caused slight decreases in population at the other concentrations of benzoate. At 21 and 35°C and pH 5.6, appreciable growth of *L. monocytogenes* occurred in the presence of 0.2% or less sodium benzoate, whereas higher concentrations were inhibitory, permitting little if any growth by the pathogen. Reducing the pH to 5.0 allowed limited growth of the pathogen at 21 and 35°C when the medium contained 0.05 or 0.1% sodium benzoate. Higher concentrations caused either complete inhibition or inhibition plus partial or complete inactivation of the pathogen during incubations of 117 h at 21°C or 78 h at 35°C.

Microbiolgoical and Sensory Quality Changes in Unwrapped and Wrapped Sliced Watermelon, S. D. Abbey, E. K. Heaton, D. A. Golden, and L. R. Beauchat, Department of Food Science and Technology, University of Georgia, Agricultural Experiment Station, Griffin, Georgia 30223-1797

J. Food Prot. 51:531-533

Experiments were done to determine the major genera and groups of microflora which grow on unwrapped and wrapped slices of watermelon stored at 5 and 25°C for up to 8 d. Changes in sensory qualities of stored watermelon were also monitored. *Pseudomonas, Escherichia coli, Enterobacter* and micrococci comprised the predominant microflora, regardless of storage temperature. Growth was slower on wrapped watermelon than on unwrapped watermelon. Subjective ratings for color, aroma, appearance, flavor and texture of unwrapped watermelon stored at 5°C decreased more rapidly than ratings for wrapped slices. Results from objective measurements of color suggested that dulling and darkening was most rapid on the surface of unwrapped watermelon, and this was attributed to more rapid oxidation of pigments when exposed to air. Objective measurement of firmness showed that wrapped watermelon retained structural integrity for a longer time than unwrapped watermelon; however, subjective ratings for texture were not correlated with these values, indicating that texture is less critical than color and flavor when overall judgments are made on sensory quality of stored watermelon.

Enterotoxin Production by Staphylococcal Isolates from Nigerian Fermented Milk Products, V. J. Umoh, A. A. Adesiyun and N. E. Gomwalk, Department of Microbiology, Faculty of Science and Department of Veterinary Public Health and Preventive Medicine, Ahmadu Bello University, Zaria, Nigeria

J. Food Prot. 51:534-537

A total of 369 samples of nono, furanono and manshanu were purchased from four different markets around Zaria, Nigeria. Five hundred and sixty-eight staphylococcal isolates were obtained from the three products of which a total of 37 (6.5%) were enterotoxigenic comprising 21 (10.7%) from nono samples and 16 (17.2%) from fura samples. The staphylococcal count, pH and titratable acidity of all the samples that contained enterotoxigenic staphylococci ranged from 5.4×10^3 to 6.3×10^4 CFU/ml, 3.89 to 4.21 and 0.47 to 0.74, respectively. Of all the staphylococcal isolates, 6.5% produced enterotoxin. Of the enterotoxigenic strains encountered 73.0% produced enterotoxin A, 10.8% B, 10.8% C and 2.7% produced combinations of A and B and A and C each. Statistical analysis revealed no correlation between either coagulase, thermonuclease, hemolysin production and enterotoxin production.

Detection of *Salmonella* with the BioEnzabead™ Enzyme Immunoassay Technique, J.-Y. D'Aoust and A. M. Sewell, Health Protection Branch, Health and Welfare Canada, Sir Frederick G. Banting Research Centre, Tunney's Pasture, Ottawa, Ontario, Canada K1A 0L2

J. Food Prot. 51:538-541

The performance of the double-antibody (MOPC 467 and 6H4) BioEnzabead™ enzyme-linked immunosorbent assay was evaluated with pure cultures and naturally contaminated foods. The immunoassay detected all but four (1.6%) of the 250 *Salmonella* test strains and showed high levels of cross-reactivity (30.7%) among the 75 strains of non-salmonellae examined. *Citrobacter freundii* figured prominently as a source of erroneous results. Although the BioEnzabead™ system identified the 41 foods found to be contaminated by a standard cultural procedure, a high rate of false-positive reactions (46%) was nevertheless encountered with high moisture foods. Attempt at method brevity through application of the immunoassay at the preenrichment level was unsuccessful resulting in the detection of only 24 (58.5%) of the 41 contaminated foods. Greater recoveries were obtained with tetrathionate brilliant green enrichment broth incubated at 43°C than at 35°C.

Color-Changing Indicator to Monitor the Time-Temperature History during Cooking of Meats, Guillermo J. Favetto, Jorge Chirife, Osvaldo C. Scorza and Carlos Hermida, Frigorifico Rioplatense S. A., Ruta 9, Km. 32-1/2, Gral Pacheco, Pcia,. de Buenos Aires, Argentina

J. Food Prot. 51:542-546

Development of a time-temperature integrator based on color changes produced by the chemical reaction between reducing sugars (i.e. fructose, glucose, lactose) and l-lysine (Maillard's reaction), is described. The indicator is particularly suitable to provide an objective method for confirming that a given temperature in the inner part of a meat product cooked in water in hermetically sealed packages, was achieved. This is needed to ascertain inactivation of the foot and mouth disease (FMD) virus and is required for meat imported from countries in which the FMD virus is present. The indicator is placed at the surface of the meat package and will avoid the need of opening the package for inspection.

Evaluation of Four Analytical Methods to Detect Weevils in Wheat: Granary Weevile, *Sitophilus granarius* (L.), in Soft White Bread, Gerald E. Russell, U.S. Food and Drug Administration, 1560 E. Jefferson Avenue, Detroit, Michigan 48207

J. Food Prot. 51:547-553

Soft white wheat was infested with adult granary weevils under controlled conditions at 3 levels of infestation, and samples were removed for testing 6 times over a total of 48 d. Three analytical methods available for use in FDA laboratories were compared along with a simple counting of the visually-detectable, insect-damaged kernels in a 100-g sample. The objective of the study was to determine how the analytical results compared with one another and with the levels of infestation. Data confirmed that the more rapid visual exam of wheat is not reliable for indicating the hidden, internally-developing weevils. Analysts should be aware of the possibility that wheat inspected visually could be passable with respect to insect-damaged kernels, but still may produce violative flour due to high insect fragment counts when processed. More research is needed to correlate insect infestation in wheat with insect fragment counts in flour. The two methods which could be used to estimate potential flour contamination caused by weevils are the x-ray exam and the cracking and flotation method, since both of these reveal the stages of weevil development inside the kernels. Tables present the results of the analyses and relate them to the number and sex of the founding adults in each level of infestation.

Growth of Rats Fed Ground Beef Treated with Aqueous Chlorine, A. W. Kotula and B. S. Emswiler-Rose, Meat Science Research Laboratory, U.S. Department of Agriculture, Agricultural Research Service, Building 201, BARC-East, Beltsville, Maryland 20705 and Microbiology Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Building 322, BARC-East, Beltsville, Maryland 20705

J. Food Prot. 51:554-557

The presence of inordinate amounts of chlorine in ground beef fed to rats is expected to elicit fasting and reduced weight gain if the rats considered the resulting diet objectionable. The 92-day growth curves for male and female rats fed the formulated diet containing beef treated with aqueous chlorine were not different from growth curves of other rats fed the diet containing unchlorinated beef. Similarly, there was no difference in dietary consumption between the two groups of rats. The growth rates of rats fed the formulated diet, with or without aqueous chlorine, were similar but greater than growth rates of other rats fed the commercial control diet. These data indicate that treatment of ground beef with aqueous chlorine did not adversely affect the consumption of the diet or the rate of growth.

Reactivation of the Lactoperoxidase System during Raw Milk Storage and its Effect on the Characteristics of Pasteurized Milk, Cecilia E. Martinez, Patricia G. Mendoza, Francisco J. Alacron and Hugo S. Garcia, Centro de Graduados, Instituto Technologico de Veracruz, Apartado Postal 1420, Veracruz, Ver, Mexico

J. Food Prot. 51:558-561

The Lactoperoxidase (LP) system was activated periodically during raw milk storage, and after pasteurization. Raw milk was stored at 4°C for 4, 6 or 8 d, and after pasteurization at 8 or 16°C, until a laboratory-trained taste panel reported the presence of off-flavors. When treated milk was stored raw for 4 d, then pasteurized it maintained its quality for 12 d at 8°C; pasteurized control milk had a shelf-life of 9 d only. Shelf-life of pasteurized milk stored at 16°C after pasteurization was 6 d for LP-treated and 5 d for control milk. LP-treated milk that was stored raw for 6 d retained its quality after pasteurization for 11 d at 8°C and 5 d at 16°C, while shelf-life for control milk of this experiment was 5 d at 8°C and 1 d at 16°C. When storage of raw milk was extended to 8 d, control milk showed off-flavors right after pasteurization, whereas LP-treated milk developed a "stored" or "unclean" taste after 1 d of pasteurized storage. Reactivation of the LP system is proposed to extend the shelf-life of pasteurized milk, when raw milk storage for over 2 d is necessary.

Chicken-to-Human Infection with *Campylobacter jejuni* and *Campylobacter coli:* Biotype and Serotype Correlation, A. Annan-Prah and M. Janc, Mikrobioloski Institut, Medicinska Fakulteta, Zaloska 4, 61105 Ljubljana, Yugoslavia

J. Food Prot. 51:562-564

Isolates of *Campylobacter jejuni* and *Campylobacter coli* isolated from two flocks of parent hens and their progeny which were followed from hatch to slaughter in 10 different farms within a 6-month period in the area of Ljubljana, Yugoslavia were bio- and serotyped. They were compared to those isolated from diarrheic patients within the same period of time. *C. jejuni* biotype I of Lior's biotyping scheme was found most predominant. Using 25 unabsorbed antisera raised against live *C. jejuni/coli* cultures, 62.2% and 44.8% of the isolates from patients and chickens, respectively, could be serotyped. Penner sergroups (PG) 1, 2, 5, 7, 9, and 22 were found common to both patients and

chickens. PG 2 was the most common isolate. PG 8, which was the second most frequently isolated serogroup from patients was not isolated from chickens. No campylobacters were isolated from 71 farm family members.

Changes in Bacterial Cell and Spore Counts of Reduced-Fat Egg Products as Influenced by Pasteurization and Spray Drying, Kerry J. Moore, Molly W. Warren, Dr. Robert Davis and Michael G. Johnson, Department of Food Science, University of Arkansas, Fayettville, Arkansas 72703 and Department of Food Science, North Carolina State University, Raleigh, North Carolina 27695

J. Food Prot. 51:565-568

Microbial counts of several laboratory-prepared defatted egg products and ingredients were determined. Commercial full-fat egg yolks (EY) were defatted with hexane, air-dried overnight, mixed with water, homogenized, pasteurized (60°C, 5 min), and spray-dried to yield a defatted egg yolk product (DEY). Egg products for scrambling (EPS) were formulated with DEY and other ingredients, processed as above, and held wet (EPS-W) or spray-dried (EPS-SD). On a dry matter basis, the log counts in colony forming units per g (log CFU/g) of EY for aerobic bacteria, yeasts and molds, and aerobic mesophilic sporeformers were low at 1.3, 1.0 and 0, respectively. For DEY these counts were 6.0, 2.4, and 4.3, respectively. These counts for DEY after pasteurization decreased by 98.6, 89.6, and 40.0%, and after spray drying decreased by 99.3, 96.1, and 83.5%, respectively, compared to the pre-pasteurization counts. For EPS-W, pasteurization reduced aerobic bacteria, yeasts and molds, and coliforms by 82.0, 86.7, and 98.7%, but did not reduce aerobic mesophilic sporeformers. Compared to pre-pasteurization counts, for EPS-SD the aerobic bacteria, yeasts and molds, coliforms, and aerobic mesophilic sporeformer counts after pasteurization decreased by 99.7, 91.9, 99.3, and 50.0%, while after spray drying the count reductions were 99.9, 98.9, 99.9, and 85.8%, respectively. Microbial counts of finished products were below guidelines set by the U.S.D.A. for egg products. No *Salmonella* were detected in any of the ingredients or prototype products at any stage of processing. The combination treatment of pasteurization followed by spray drying significantly reduced the spore counts of DEY and EPS-SD, compared to pre-pasteurization counts.

Microanalytical Quality of Imported Green Coffee Beans, John S. Gecan, Ruth Bandler and John C. Atkinson, Division of Microbiology and Division of Mathematics, Food and Drug Administration, Washington, DC 20204

J. Food Prot. 51:569-570

A 3-year national survey was made to determine the sanitary quality of green coffee beans offered for import into the United States. The methods of the Food and Drug Administration's Macroanalytical Procedures Manual were used to analyze samples for mammalian excreta, insect damage and mold. Insect damage was the most frequently encountered defect. The percent of samples containing insect damage was 70.6%, and the range of insect-damaged beans was 0 to 31.0% per sample. Mold was found in 23.5% of the samples, and percent of moldy beans ranged from 0 to 31.0% per sample. Mammalian excreta was found in 9.3% of the samples, and levels ranged from 0 to 50.63 mg/lb. African and Asian coffee beans generally had higher mean analyte levels than did beans from Central and South America.

Examination of Enterotoxin Production at Low Tamperature by *Yersinia* spp. in Culture Media and Foods, Donald A. Schiemann, Department of Microbiology, Montana State University, Bozeman, Montana 59717

J. Food Prot. 51:571-573

Sixteen of 27 (59%) cultures of *Yersinia* spp. produced enterotoxin measured by the suckling mouse assay at 25°C in aerated broth culture media. Only one of 15 of these cultures, which was identified as *Yersinia kristensenii*, produced enterotoxin at 6°C. No enterotoxin was detected in water and methanol extracts of 6 food slurries inoculated with this toxigenic culture after incubation at 9.8°C for 4 d.

Essential Elements in Dry and Canned Chick Peas (*Cicer arietinum L.*), Anthony Lopez and Harriet L. Williams, Department of Food Science and Technology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061

J. Food Prot. 51:574-576

Ten essential elements were determined in dry and canned chick peas (*Cicer arietinum L.*) by atomic absorption spectrophotometry. Samples were taken at different stages during the canning process to determine where changes in element content occurred. The content of each sample was compared statistically to other samples taken within the process. Element retention, excluding chloride and sodium, ranged from 12 to 127% on a dry weight basis and 4 to 45% on wet weight basis.

Performance of Some Heat-Sensitive Differential Agars Prepared and Melted by Microwave Energy, C. Liang and D. Y. C. Fung, Department of Animal Sciences and Industry, Kansas State University, Manhattan, Kansas 66506

J. Food Prot. 51:577-578

The viable cell count performance of some heat-sensitive differential agars prepared and remelted by microwave energy was evaluated for *Salmonella choleraesui, Streptococcus faecalis* and *Escherichia coli*. The conventional boiling method was used for comparison. No significant difference was found between the microwave oven processed agar and the conventional-boiling processed agar in viable cell counts of the target bacteria. Heating and reheating of violet red bile agar, bismuth sulfite agar, and KF Streptococcus agar by both methods did not change agar performance. However, remelting of desoxycholate citrate agar by both methods resulted in a substantial lowering of viable cell counts.

Performance of a DNA Probe-Based *Salmonella* Test in the AACC Check Sample Program, Barry S. Sall, Massimo Lombardo, Brendan Sheridan and George H. Parsons, GENE-TRAK Systems, Framingham, Massachusetts 01701

J. Food Prot. 51:579-580

The performance of the GENE-TRAK® *Salmonella* assay in food as been evaluated with samples of flour or flour based bakery mix provided by the American Association of Cereal Chemists (AACC) check sample program. Six pairs of coded samples were tested from November 1986 through September 1987. The test correctly identified all six positive and six negative samples. This included a lactose positive *Salmonella* strain that was missed by a large majority of the other laboratories that participated in the survey. These results indicate that DNA probe technology can provide not only more timely results than traditional methods, but in some cases can actually provide more accurate information.

Botulism in Native Peoples - An Economic Study, Ewen C. D. Todd, Bureau of Microbial Hazards, Food Directorate, Health Protection Branch, Health and Welfare Canada, Ottawa, Ontario, K1A 0L2, Canada

J. Food Prot. 51:581-587

Type E botulism occurs regularly in scattered locations in the Canadian Arctic and northern coastal British Columbia from the consumption of improperly fermented fish and marine mammal products by native peoples, with an average of eight cases and 1.5 deaths each year. Local treatment at nursing stations is often followed by the evacuation of the patients to the main northern hospitals, e.g. Iqaluit and Inuvik with subsequent intensive care, if necessary, in Montreal, Winnipeg, Edmonton or Vancouver. Estimates of costs of six incidents in these northern regions showed that the evacuation of patients was the most expensive component (mean, 31.2%), followed by hospitalization (23.8%) and investigation of the illnesses (19.4%). The mean cost per incident was over $70,000, or $7,200 per case. If these figures are extrapolated, the cost of botulism in these areas is about $2 million each year, with $1.5 million being considered the value of the lives lost. Current and future health care practices in northern regions should be evaluated in relation to these and other costs.

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August 1-5, BIOTECHNOLOGY: MICROBIAL PRINCIPLES AND PROCESSES FOR FUELS, CHEMICALS AND BIOLOGICALS, sponsored by the Massachusetts Institute of Technology, Cambridge, MA. For further information, contact: Director of Summer session, MIT, Room E19-356, Cambridge, MA 02139.

August 7-12, 1988 ANNUAL MEETING OF THE SOCIETY FOR INDUSTRIAL MICROGIOLOGY, to be held at the Hyatt Regency, Chicago, IL. For more information, contact: Mrs. Ann Kulback, SIM, PO Box 12534, Arlington, VA.

August 15-17, PRINCIPLES OF PACKAGE DEVELOPMENT, to be held in Chicago, Illinois. For more information, contact: The Center for Professional Advancement, 46 West Ferris St., East Brunswick, NJ 08816, (201) 613-4500.

August 18-19, EXTENDED SHELF LIFE OF FOODS, to be held in Chicago, Illinois. For more information, contact: The Center for Professional Advancement, 46 West Ferris St., East Brunswick, NJ 08816, (201) 613-4500.

September 7-8, ANNUAL CONFERENCE OF THE NORTH CENTRAL CHEESE INDUSTRIES ASSOCIATION, South Dakota State University, Brookings, SD. For further information, contact: E.A. Zottola, Sec-Trea., NCCIA, PO Box 8113, St. Paul, MN 55108.

September 11-13, NATIONAL DAIRY COUNCIL OF CANADA ANNUAL CONFERENCE, to be held at the Winnipeg Convention Centre, Winnipeg, Manitoba. For more information, contact: Pat MacKenzie, 141 Laurier Avenue West, Ottawa, Ontario, Canada K1P-5J3.

September 11-14, SOTUHERN ASSOCIATION OF DAIRY FOOD MANUFACTURERS, INC. 74TH ANNUAL CONVENTION, to be held at the Boca Raton Hotel & Club, Boca Raton, FL. For more information, contact: John E. Johnson, P.O. Box 1050, Raleigh, NC 27605.

September 13-15, SPECIAL PROBLEMS IN MILK PLANTS COURSE, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians. To be held at the Howard Johnson Plaza So., IH 35 at Woodward, Austin, TX. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX

September 14-16, AACC - SENSORY EVALUATION OF FOOD, to be held in St. Paul, Minnesota. For information, contact: AACC Short Course Program, 3340 Pilot Knob Rd, St. Paul, MN 55121 (612) 454-7250.

September 15-16, WISCONSIN LABORATORY ASSOCIATION ANNUAL EDUCATION CONFERENCE, will be held at the Paper Valley Hotel and Conference Center, Appleton, Wisconsin. Contact: Gary Jansen, Pabst Brewing Co., Box 706, Milwaukee, WI 53201 (414) 223-3574.

September 19-20, POULTRY HEALTH SEMINAR, to be held at the Raddison Hotel, Atlanta, Georgia. For more information, contact: Southeastern Poultry & Egg Association, 1458 Church St., Decatur, GA 30030, (404) 377-6465.

September 20-21, WISCONSIN ASSOCIATION OF MILK AND FOOD SANITARIANS JOINT EDUCATIONAL CONFERENCE, to be held at the Ramada Inn, 2325 Bainbridge Rd, LaCrosse, WI 54601. For additional information about the conference, contact: Ron Buege, West Allis Health Dept., 7120 West National Ave., West Allis, WI 53214, (414) 256-8360.

September 21-22, UNITED DAIRY INDUSTRY ASSOCIATION ANNUAL MEETING, to be held at the Hyatt Regency Minneapolis, Minneapolis, Minnesota. For more information, contact: Edward A. Peterson, 6300 N. River Rd., Rosemont, IL 60018.

September 21-22, FIRST ANNUAL MEHA FOOD CONFERENCE, PROBLEMS AND SOLUTIONS, to be held at the Harley Hotel in Lansing, Michigan. For more information, contact: Ike Volkers, Michigan Dept. of Public Health, 3500 N. Logan, PO Box 30035, Lansing, MI 48909 (517) 335 - 8268.

September 21-22, VIRGINIA DAIRY QUALITY CONTROL CONFERENCE, to be held at the Sheraton Red Lion Inn, Blacksburg, Virginia. Sponsored by the Virginia Dairy Products Assoc. For more information, contact: J. Russell Bishop, Food Science & Technology, Virginia Tech. Univ., Blacksburg, VA 24061 (703) 961- 4921.

September 26-28, INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC. ANNUAL FALL MEETING, to be held at the Hilton Inn in Fort Wayne, IN. For information, contact: Rosemarie Hansel, Marion Co. Health Dept., 222 East Ohio St., Indianapolis, IN 46204 (317) 633-9682.

September 27-29, NEW YORK STATE ASSOCIATION OF MILK AND FOOD SANITARIANS, to hold annual meeting at the Shertaon Inn-Binghamton, Sarbro Square, One Sarbro Square, Binghamton, NY 13901. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004 (716) 937-3432.

September 29-30, SOUTH DAKOTA STATE DAIRY ASSOCIATION, will hold it's annual convention at the Holiday Inn, Brookings, SD. For more information, contact: Shirley W. Seas, Dairy Science Dept., SD State Univ., Brookings, SD 57007 (605) 688 -5480.

October 3-5, CONFERENCE ON LISTERIA MONOCYTOGENES, will be held in Rohnert Park, California. It is sponsored by The Society for Industrial Microbiology. Additional information can be obtained from: Mrs. Ann Kulback, SIM, PO Box 12534, Arlington, VA 22209 (703) 941-5373.

October 8-9, MICROWAVE PROCESSING OF FOOD, sponsored by AACC to be held in San Diego, CA. Information can be obtained by contacting: AACC Short Course Program, 3340 Pilot Knob Rd., St. Paul, MN 55121 (612) 454-7250.

October 9-13, AACC ANNUAL MEETING, to be held at the Hotel InterContinental San Diego, in San Diego, California. For more information, contact: Raymond J. Tarleton, American Assoc. of Cereal Chemists, 3340 Pilot Knob Rd., St. Paul, MN 55121 (612) 454-7250.

October 15-19, MILK INDUSTRY FOUNDATION & INTERNATIONAL ICE CREAM ASSOCIATION ANNUAL CONVENTION & SHOW, to be held at Marriott's Orlando World Center, Orlando, Florida. For more information, contact: John F. Speer, Jr., 888 16th St., NW, Washington, DC 20006.

October 17-19, BIOTECHNOLOGY PROCESSING ENGINEERING CENTER FOURTH ANNUAL SYMPOSIUM, to be held at the Massachusetts Institute of Technology, Cambridge, Massachusetts. For additional information, contact: MIT, BPEC, Room 20A-207, Cambridge, MA 02139, (617) 253-0805.

October 18-19, CALIFORNIA ASSOCIATION OF DAIRY AND MILK SANITARIANS CONFERENCE, to be held at the Concord Hilton Hotel, Concord, California. For more information, contact: Jack Coppes, Executive Secretary, PO Box 9234, Whittier, CA 90608, (213) 699 - 4313.

October 31-November 3, FOOD PROCESSING WASTE CONFERENCE, will be held at the Pierremont Plaza Hotel, Atlanta, Georgia. The conference is sponsored by the Environment, Health and Safety Division, Georgia Tech Research Institute. Additional information can be obtained from Edd Valentine or Chuck Ross, Georgia Tech Research Institute, Economic Development Laboratory, Environment, Health and Safety Division, Atlanta, GA 30332, (404) 894-3412.

November 2-4, GUM CHEMISTRY AND TECHNOLOGY, will be held in Chicago, Illinois. For more information, contact: AACC Short Course Program, 3340 Pilot Knob Rd., St. Paul, MN 55121, (612) 454-7250.

November 1-3, BASIC PASTEURIZATION COURSE, to be held at the Viscount-Travel Lodge, 1818 Southwest Freeway, Houston will be sponsored by the Texas Association of Milk, Food and Environmental Sanitarians. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363, (512) 458-7281.

November 1-3, NORTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION, annual fall conference to be held in Minot, North Dakota at the Holiday Inn. For more information contact: Peri Dura, (701) 224-2382.

November 28-December 1, NATIONAL MILK PRODUCERS FEDERATION ANNUAL MEETING, to be held at the Hilton, Anaheim, California. For more information, contact: James C. Barr, 1840 Wilson Blvd., Arlington, VA 22201.

November 30-December 1, FIELD AND LABORATORY SAMPLING OF FOOD, DRUGS, AND AGRICULTURAL COMMODITIES, to be held in Arlington, Virginia. Course size is limited and on a "first come" basis. To register, first verify space availability by calling or writing AOAC Education Dept., 1111 N 19th St., Suite 210, Arlington, VA 22209, (703) 522-3032.

December 8-9, STARCH: STRUCTURE, PROPERTIES AND FOOD USES, sponsored by AACC to be held in Chicago, Illinois. Information can be obtained by contacting: AACC Short Course Program, 3340 Pilot Knob Rd., St. Paul, MN 55121, (612) 454-7250.

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